

**APPENDIX 4.1-8**  
*Land Exchange Alternative*  
*Noise Impact Report*



**Acoustical Analysis Report  
for Otay Ranch Village I4 and Planning Areas I6/I9  
Land Exchange EIR Alternative**

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## GLOSSARY OF TERMS AND ACRONYMS

A list of terms and acronyms used in the report is presented below.

Term	Definitions
ADT	average daily traffic
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
City	City of Chula Vista
CNEL	Community Noise Equivalent Level – CNEL is the average equivalent A-weighted sound level during a 24-hour day and it is calculated by adding 5 dB to sound levels in the evening (7 p.m. to 10 p.m.) and adding 10 dB to sound levels in the night (10 p.m. to 7 a.m.).
County	County of San Diego
CTMP	Community Trails Master Plan
dB	Decibel – A unit for measuring sound pressure level and is equal to 10 times the logarithm to the base 10 of the ratio of the measured sound pressure squared to a reference pressure, which is 20 micropascals.
dBA	A-weighted decibel
EIR	Environmental Impact Report
GDP/SRP	General Development Plan/Otay Subregional Plan
HVAC	heating, ventilation, and air conditioning
Hz	Hertz
I	Interstate
L <sub>den</sub>	Day/Evening/Night Noise Equivalent Level – same as CNEL
L <sub>eq</sub>	Equivalent continuous sound level
L <sub>max</sub>	Maximum sound level during the measurement interval
L <sub>eq(h)</sub>	Hourly Equivalent Noise Level – The sound level corresponding to a steady state sound level containing the same total energy as a time varying signal over an hour period.
mph	miles per hour – average vehicle travel speed
NSLU	Noise Sensitive Land Use
MSCP	Multiple Species Conservation Program
PPV	peak particle velocity
Refuge	San Diego National Wildlife Refuge
RMP	Resource Management Plan
RMS	root mean square
SR	State Route
SRP	Subregional Plan
TNM	Federal Highway Administration Traffic Noise Model – TNM 2.5
VdB	velocity decibel

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## SUMMARY

Dudek has prepared this noise study for the proposed Otay Ranch Village 14 and Planning Area 16/19 Land Exchange Alternative (Land Exchange Alternative), evaluating exterior noise impacts associated with traffic along Proctor Valley Road and roadways predicted to experience potentially significant increases in traffic volumes as a result of the Land Exchange Alternative (San Miguel Ranch Road, Mount Miguel Road, Hunte Parkway, Lane Avenue, Northwoods Drive, and Melody Road). Land Exchange Alternative-related on-site operational noise, construction noise, and vibration (including blasting and rock-crushing activities) are also evaluated.

The primary existing noise source within the Land Exchange Area (defined in Section 1, Introduction) is vehicular traffic from Proctor Valley Road. Proctor Valley Road is currently a two-lane, unimproved, dirt roadway with an average daily traffic (ADT) volume of approximately 200 within the Land Exchange Area. By the Year 2030, the traffic volume along Proctor Valley Road within the Land Exchange Area (south of Project Driveway No. 1) is projected to be up to 6,000 ADT without the Land Exchange Alternative and 17,900 ADT with the Land Exchange Alternative. No other noise sources potentially affecting the Land Exchange Alternative have been identified.

The future traffic noise is anticipated to exceed the County of San Diego (County) noise standard of 60 decibels (dB) Community Noise Equivalent Level (CNEL) at the outdoor living areas of single-family lots within the Land Exchange Area adjacent to Proctor Valley Road without mitigation. With mitigation in the form of 6-foot-high noise barriers, traffic noise levels within the Land Exchange Area are reduced to below the County's 60 dB CNEL exterior noise criterion.

Without implementation of noise mitigation measures, noise levels would exceed 60 dB CNEL at the second-floor level facade of the single-family residential lots directly adjacent to Proctor Valley Road within the Land Exchange Area, thus potentially exceeding the County's 45 dB CNEL interior noise criterion. Before issuance of building permits, an interior noise study would be required for the single-family residential units adjacent to Proctor Valley Road within the Land Exchange Area to ensure that the interior CNEL would not exceed 45 dB. The residences would most likely require heating, ventilation, and air conditioning (HVAC) systems to meet the County's interior noise standard. Sound-rated windows may also be required.

Noise from on-site operational activities is considered a potentially significant impact. The Land Exchange Alternative's operational noise sources would include air-conditioning units at each of the single-family and multifamily homes. The impact of noise from HVAC equipment or other noise-generating on-site equipment under the Land Exchange Alternative is considered a potentially significant impact. Mitigation measures (e.g., preparation of an acoustical study or

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studies of the proposed stationary noise sources ensuring compliance with applicable standards prior to the issuance of building permits) are provided to reduce potential impacts to a level below significance.

Noise from on-site rock drilling, blasting, and rock-crushing activities associated with Land Exchange Alternative construction is considered potentially significant, and mitigation measures to reduce potential effects to a level below significance are provided in this report. Construction noise, associated with improvement of Proctor Valley Road and on-site construction activities, would result in potentially significant impacts at adjacent, occupied residences. Mitigation measures in the form of the requirement for preparation and implementation of a blasting and monitoring plan and the requirement of minimum setbacks to reduce these potential effects to a level below significance are provided in this report.

Construction activities would result in vibration anticipated to be below the level of human perception at existing off-site noise/vibration sensitive land uses; the potential vibration impacts to these residential structures are less than significant. Because the development of the Land Exchange Alternative would be a multiyear endeavor, portions of the development would be completed and occupied during the construction of subsequent portions (phases). Vibration from construction activities, if the activities occur within 200 feet of on-site residences, has the potential to result in vibration levels considered potentially significant. Mitigation measures are provided in the form of the requirement for preparation and implementation of a vibration monitoring program to reduce these potential effects to a level below significance.

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## 1 INTRODUCTION

Dudek has prepared this noise study for the Otay Ranch Village 14 and Planning Area 16/19 Land Exchange Alternative (Land Exchange Alternative), evaluating exterior noise impacts associated with Land Exchange Alternative-related traffic on Proctor Valley Road and other arterial roadways in the Land Exchange Area, as well as construction and on-site operational noise and vibration.

This analysis is based on the Land Exchange Alternative's Tentative Parcel Map (Hunsaker & Associates 2015a). Field noise measurement data are included in Appendix A, and sound modeling application input/output data are included in Appendix B.

### **Land Exchange Alternative Location and Description**

#### *Overview and Background*

This technical report provides a project-level analysis of the Land Exchange Alternative (defined below) for inclusion in the Otay Ranch Village 14 and Planning Areas 16/19 Environmental Impact Report (EIR). The regional location is shown in Figure 1.

The Land Exchange Alternative is located within Otay Ranch Village 14 and Planning Areas 16/19 in the Proctor Valley parcel of Otay Ranch, as shown in Figure 2, Project Location Map. Village 14 and Planning Areas 16/19 are part of the larger Otay Ranch, an approximately 23,000-acre master-planned community in southern San Diego County designed as a series of villages and planning areas.

The Land Exchange Alternative proposes 1,530 homes within a development footprint that is limited to Otay Valley Village 14. The majority of Planning Areas 16/19 would be converted to Multiple Species Conservation Program (MSCP) and Otay Ranch Resource Management Plan (RMP) Preserve land and would not be developed.

The following describes the major components and characteristics of the Land Exchange Alternative.

### **Definitions**

#### *“Land Exchange Area” Defined*

As previously indicated, the “Land Exchange Area” is located within Otay Ranch Village 14 and Planning Areas 16/19 as depicted in Figure 3, Proctor Valley Site Utilization Plan. The total Land Exchange Area covers approximately 2,387 acres, of which the applicant owns 1,294 acres, the state owns approximately 1,053 acres, and 39.9 acres are off site. Within the Land Exchange Area,

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there are 1,003 acres in Village 14 and 1,345 acres in Planning Areas 16/19. Off sites include Proctor Valley Road and related utilities in the south and central portions of Village 14. The state's ownership is included to process a General Plan Amendment to remove existing approved Otay Ranch General Development Plan/Otay Subregional Plan (GDP/SRP) County General Plan development land uses and convert these acres to Otay Ranch RMP/MSCP Preserve.

### ***“Land Exchange Alternative” Defined***

The Land Exchange limits development to Otay Ranch Village 14 and converts the majority of development approved by the Otay Ranch GDP/SRP in Planning Areas 16/19 to MSCP and Otay Ranch RMP Preserve. The Land Exchange Alternative assumes the completion of a land exchange agreement with the State of California and a simultaneous boundary adjustment to the MSCP and Otay Ranch RMP Preserve systems.

Specifically, the “Land Exchange Alternative” proposes to:

- Exchange 278 acres owned by the state in Village 14 for 278 acres owned by the applicant in Planning Area 16.
- Change MSCP and Otay Ranch RMP Preserve boundaries via a boundary adjustment where approximately 169.8 acres in Planning Areas 16/19 are converted to Otay Ranch RMP Preserve and 142.3 acres in Village 14 are converted to Ota Ranch Preserve and 43.6 acres in Village 14 are converted to development footprint for a net increase in Otay Ranch RMP Preserve of 268.5 acres.

The Land Exchange Alternative would involve a Specific Plan, General Plan Amendments, EIR, Rezone, Tentative Map, the Otay Ranch RMP Amendment, and County MSCP Subarea Plan South County Segment Boundary Adjustment.

### ***“Village 14” Defined***

“Village 14” as referred to herein is a discrete subset of the Land Exchange Area and reflects that portion located exclusively within Village 14. The majority of the technical reports focus on Village 14 as this is where the development is planned.

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## Proposed Specific Plans

### *Summary*

The adopted Otay Ranch GDP/SRP requires preparation of a Site Utilization Plan that describes the land uses. Figure 3 depicts the proposed Site Utilization Plan. Additionally, Table 1 quantifies the land uses.

The Land Exchange Alternative includes approximately 511 acres designated for 1,530 homes, 1,124 of which would be traditional single-family homes, 283 would be single-family age-restricted homes, and 123 would be multifamily homes as indicated in Table 1. Eighteen neighborhoods are planned with approximate densities ranging from 1.5 to 15.0 dwelling units per acre. The age-restricted neighborhoods would be gated, as would four of the single-family neighborhoods situated on the largest lots.

Village 14 in the Land Exchange Alternative is planned around a Village Core, centrally located in the heart of the village. Higher-density residential uses would be adjacent to the Village Core with single family residential radiating out in decreasing density. The Village Core is composed of the Neighborhood Center, which includes an 8-acre elementary school; a 4-acre Village Green (public park); a 3-acre Mixed-Use Site with up to 15,000 square feet of commercial/retail uses and 54 multifamily homes; and a 2-acre Village Square Community Facility. The Village Core also includes a 2-acre public safety site for a fire station and sheriff's storefront facility and 69 multifamily townhomes located adjacent to the public safety site.

The Land Exchange Alternative is designed around an active lifestyle and wellness recreation theme and includes an extensive park and recreation system, including four public parks totaling 13 acres. The remaining private recreation facilities include three private swim clubs, a senior activity center, the Village Square community facility and numerous pocket parks totaling approximately 9 acres. Approximately 4.6 miles of Community Pathway are proposed on the Proctor Valley Road. Approximately 3 miles of Park-to-Park Loop connect to the regional pathway.

After implementing the proposed land exchange agreement, MSCP and RMP Preserve boundary adjustment, and General Plan Amendment, the Land Exchange Area would include 1,749 acres of land for MSCP and Otay Ranch RMP Preserve, consisting of 404 acres in Otay Valley Village 14, and 1,345 acres in Planning Areas 16/19.

### *Circulation and Access*

Under the Land Exchange Alternative, regional access to Village 14 would be provided by State Route (SR) 125, located approximately 3 miles to the west. Interstate (I) 805, approximately 8

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miles to the west, provides secondary north/south access. SR-54, located approximately 6 miles to the northwest, connects to SR-125 and I-805, and provides regional east/west access.

Proctor Valley Road would provide the main access to Village 14. Five roundabouts would identify the entrance into each residential area as well as provide traffic calming at key internal intersections. The internal circulation plan also includes a series of collectors and residential streets to provide access to the residential neighborhoods.

Proctor Valley Road is planned as a two-lane road and is designated as a scenic corridor. The Land Exchange Alternative includes an Otay Ranch GDP/SRP amendment to the classification of Proctor Valley Road from a Four-Lane Major to a Two-Lane Light Collector. The northern connection of Otay Valley Village 14 to Jamul would be in the alignment of the existing partially improved Proctor Valley Road and would be paved provide both public access and secondary emergency access to both communities.

The Land Exchange Alternative's Circulation Plan incorporates vehicular and non-vehicular modes of transportation to create an integrated system of roads, bike lanes, trails, pathways, and sidewalks.

### *Options*

The Land Exchange Alternative includes three options for internal circulation: (1) the Proctor Valley Road North Option, (2) the Preserve Trails Option, and (3) the Perimeter Trail Option. The EIR Land Exchange Alternative assesses each of these options and their respective impacts. Each of the options is summarized below. For detailed descriptions with exhibits, see the Specific Plan Section VIII, Internal Circulation Options (RH Consulting 2018).

**Proctor Valley Road North Option:** The Proctor Valley Road North Option applies to Proctor Valley Road street section 10 at the northerly edge of Village 14. Street sections 10 would be replaced with street section 10B to provide for two dedicated bike lanes (one on each side of the road) instead of the “sharrows”<sup>1</sup> proposed in the Land Exchange Alternative. Note that street section 10A would provide a transition section at the northerly property boundary and would not change in the Proctor Valley Road North Option. Generally, the Proctor Valley Road North Option would increase the right-of-way width from 40 feet to 48 feet.

**Preserve Trails Option:** The Preserve Trails Option consists of two segments of existing, disturbed trails. These segments would be located within the Otay Ranch RMP Preserve. The Preserve Trails Option would include segments “A” and “B” as identified in the Otay Ranch

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<sup>1</sup> Sharrows are road markings that guide bicyclists to bike routes between neighborhoods and alert motorists to the presence of bicyclists within the shared travel lane.



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GDP/SRP, which are also identified as segments 52 and 49 in the County of San Diego's Community Trails Master Plan (CTMP) (County of San Diego 2005). Segment A/52 would be 4,450 lineal feet, generally located at the northern terminus of Village 14 and extending northeast through the on-site Otay Ranch RMP Preserve to the eastern edge of the Echo Valley loop (CTMP Trail 53). Segment B/49 would be approximately 3,100 lineal feet and be located between South and Central Village 14 along an existing, historic ranch road. This trail is located within the on-site Otay Ranch RMP Preserve and bisects regional wildlife corridor R1. The Preserve Trails Option would retain these portions of trails in their existing conditions, which meet the CTMP primitive trail standard. No improvements to these Preserve Trails would be part of the Land Exchange Alternative.

**Perimeter Trail Option:** The Perimeter Trail Option would be an approximately 4.5-mile perimeter trail located within the Development Footprint of Village 14. The Perimeter Trail Option would be situated primarily within the Otay Ranch RMP 100-foot Preserve Edge. The Perimeter Trail Option is designed to CTMP primitive trail standards, and the trail tread would vary from 2 to 6 feet wide. Due to topography, trail grade would range from 2% to the maximum grade allowed of 30%. The Perimeter Trail Option would require construction of approximately 5,200 lineal feet (1 mile) of 5- to 7-foot-high retaining walls due to steep topography and drainage constraints. The Perimeter Trail Option would be graded as part of overall Land Exchange Alternative grading, and would not encroach into the Otay Ranch RMP Preserve. The perimeter trail would be accessed at public parks and trailheads, and would be maintained by the County.

Dudek has evaluated these options and determined they are not material to the information presented in this analysis because (1) the construction of these options would not change the equipment mix and construction noise levels and (2) the operation of these options would not result in significant noise

**Table 1**  
**Site Utilization Plan – Land Use Summary**

Otay Ranch Village 14		Acres <sup>a</sup>	Units	Density
<i>Residential Uses</i>				
<i>Single Family Residential</i>				
R-1	SF-2	28.9	112	3.9
R-2	SF-2	37.1	72	1.9
R-3	SF-1	41.7	67	1.6
R-4	SF-2	14.3	57	4.0
R-5	SF-2	33.9	109	3.2
R-6	SF-2	30.6	75	2.4
R-7	SF-2	32.1	91	2.8

# Acoustical Analysis Report for Otay Ranch Village 14 and Planning Areas 16/19 – Land Exchange EIR Alternative

**Table 1**  
**Site Utilization Plan – Land Use Summary**

Otay Ranch Village 14		Acres <sup>a</sup>	Units	Density
R-8	SF-2	20.1	47	2.3
R-9	SF-1	41.5	74	1.8
R-10	Age-Restricted SF-1	42.5	127	3.0
R-11	Age-Restricted SF-1	34.4	156	4.5
R-12	SF-2	12.3	44	3.6
R-13	SF-1	36.4	66	1.8
R-14	SF-2	26.9	60	2.2
R-15	SF-1	38.5	59	1.5
R-16	SF-3	31.7	191	6.0
<i>Single Family Subtotal</i>		<i>503.1</i>	<i>1,407</i>	<i>2.8</i>
<i>Multifamily and Mixed Use</i>				
MF-1		4.6	69	15.2
MU-1 <sup>b</sup>		3.5	54	15.5
<i>Multifamily and Mixed Use Subtotal</i>		<i>8.8</i>	<i>123</i>	<i>15.3</i>
<i>Residential Subtotal<sup>c</sup></i>		<i>511.2</i>	<i>1,530</i>	<i>3.0</i>
<i>Non-Residential Uses</i>				
<i>Public Parks Subtotal</i>		<i>13.5</i>	<i>—</i>	<i>—</i>
<i>Private Parks/Recreation Subtotal</i>		<i>6.9</i>	<i>—</i>	<i>—</i>
<i>Public Uses</i>				
Public Safety Site		2.3	—	—
Elementary School		8.3	—	—
<i>Public Uses Subtotal</i>		<i>10.6</i>	<i>—</i>	<i>—</i>
<i>Open Space and Preserve</i>				
Internal Open Space <sup>d</sup>		33.4	—	—
Otay Ranch RMP Preserve		403.9	—	—
<i>Open Space and Preserve Subtotal</i>		<i>437.3</i>	<i>—</i>	<i>—</i>
<i>Circulation Subtotal<sup>e</sup></i>		<i>23.1</i>	<i>—</i>	<i>—</i>
<i>Non-Residential Uses Subtotal</i>		<i>491.4</i>	<i>—</i>	<i>—</i>
<i>Otay Ranch Village 14 Subtotal</i>		<i>1,002.6</i>	<i>1,530</i>	<i>1.5</i>
<i>Planning Area 16/19 Preserve</i>				
Circulation <sup>f</sup>		16.4	—	—
Otay Ranch RMP Preserve		275.4	—	—
Exchange to state for Preserve		278.0	—	—
Existing state ownership (portion)		775.1	—	—
<i>Planning Area 16/19 Preserve Subtotal</i>		<i>1,344.9</i>	<i>—</i>	<i>—</i>
<b>Village 14 and Preserve Grand Total</b>		<b>2,347.4</b>	<b>1,530</b>	<b>0.7</b>

R = Residential; SF = Single Family; MF = Multifamily; MU = Mixed Use

<sup>a</sup> Additional off sites excluded from the acreage above include:

Proctor Valley Road off site central and south (39.9 acres)

Off-site sewer to Salt Creek Interceptor

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- <sup>b</sup> Mixed-Use acreage includes 15,000 square feet of commercial use.
- <sup>c</sup> Residential acreage includes 151.6 acres of fuel modification and internal open space slopes and 2.6 acres of private pocket parks.
- <sup>d</sup> Open Space included 11.3 acres of basins and homeowners' association open space lots not included in the residential acreage.
- <sup>e</sup> Proctor Valley Road on site in Village 14 only.
- <sup>f</sup> Proctor Valley Road north in Planning Area 16 is in Preserve.

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## **2 FUNDAMENTALS OF NOISE AND VIBRATION**

The following is a brief discussion of fundamental noise concepts and terminology.

### **2.1 Sound, Noise, and Acoustics**

Sound is actually a process that consists of three components: the sound source, sound path, and sound receiver. All three components must be present for sound to exist. Without a source to produce sound, there is no sound. Similarly, without a medium to transmit sound pressure waves, there is no sound. Finally, sound must be received; a hearing organ, sensor, or object must be present to perceive, register, or be affected by sound or noise. In most situations, there are many different sound sources, paths, and receptors rather than just one of each. Acoustics is the field of science that deals with the production, propagation, reception, effects, and control of sound. Noise is defined as sound that is loud, unpleasant, unexpected, or undesired.

### **2.2 Sound Pressure Levels and Decibels**

The amplitude of a sound determines its loudness. Loudness of sound increases with increasing amplitude. Sound pressure amplitude is measured in units of micronewton per square meter, also called micropascal. One micropascal is approximately one-hundred billionth (0.0000000001) of normal atmospheric pressure. The pressure of a very loud sound may be 200 million micropascals, or 10 million times the pressure of the weakest audible sound. Because expressing sound levels in terms of micropascal would be very cumbersome, sound pressure level in logarithmic units is used instead to describe the ratio of actual sound pressure to a reference pressure squared. These units are called bels. To provide a finer resolution, a bel is subdivided into 10 decibel (dB).

### **2.3 A-Weighted Sound Level**

Sound pressure level alone is not a reliable indicator of loudness. The frequency, or pitch, of a sound also has a substantial effect on how humans will respond. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness, or human response, is determined by the characteristics of the human ear.

Human hearing is limited not only in the range of audible frequencies, but also in the way it perceives the sound in that range. In general, the healthy human ear is most sensitive to sounds between 1,000 and 5,000 Hertz (Hz), and it perceives a sound within that range as more intense than a sound of higher or lower frequency with the same magnitude. To approximate the frequency response of the human ear, a series of sound level adjustments is usually applied to the sound measured by a sound level meter. The adjustments (referred to as a weighting network) are

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frequency-dependent. The A-scale weighting network approximates the frequency response of the average young ear when listening to ordinary sounds. When people make judgments about the relative loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Other weighting networks have been devised to address high noise levels or other special situations (e.g., B-scale, C-scale, D-scale), but these scales are rarely used in conjunction with most environmental noise. Noise levels are typically reported in terms of A-weighted sound levels. All sound levels discussed in this report are A-weighted decibels (dBA). Examples of typical noise levels for common indoor and outdoor activities are depicted in Table 2.

**Table 2**  
**Typical Sound Levels in the Environment and Industry**

Common Outdoor Activities	Noise Level (dB)	Common Indoor Activities
—	110	Rock band
Jet fly over at 300 meters (1,000 feet)	100	—
Gas lawn mower at 1 meter (3 feet)	90	—
Diesel truck at 15 meters (50 feet), at 80 kilometers per hour (50 miles per hour)	80	Food blender at 1 meter (3 feet); garbage disposal at 1 meter (3 feet)
Noisy urban area, daytime; gas lawn mower at 30 meters (100 feet)	70	Vacuum cleaner at 3 meters (10 feet)
Commercial area; heavy traffic at 90 meters (300 feet)	60	Normal speech at 1 meter (3 feet)
Quiet urban, daytime	50	Large business office; dishwasher next room
Quiet urban, nighttime	40	Theater; large conference room (background)
Quiet suburban, nighttime	30	Library
Quiet rural, nighttime	20	Bedroom at night; concert hall (background)
—	10	Broadcast/recording studio
Lowest threshold of human hearing	0	Lowest threshold of human hearing

Source: Caltrans 2013a.

### 2.4 Human Response to Changes in Noise Levels

Under controlled conditions in an acoustics laboratory, the trained, healthy human ear is able to discern changes in sound levels of 1 dBA when exposed to steady, single-frequency signals in the mid-frequency range. Outside such controlled conditions, the trained ear can detect changes of 2 dBA in normal environmental noise. It is widely accepted that the average healthy ear, however, can barely perceive noise level changes of 3 dBA. A change of 5 dBA is readily perceptible, and a change of 10 dBA is perceived as twice or half as loud. A doubling of sound energy results in a 3 dBA increase in sound, which means that a doubling of sound energy (e.g., doubling the volume of traffic on a road) would result in a barely perceptible change in sound level.

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## 2.5 Noise Descriptors

Additional units of measure have been developed to evaluate the long-term characteristics of sound. The equivalent sound level ( $L_{eq}$ ) is also referred to as the time-average sound level. It is the equivalent steady-state sound level that in a stated period of time would contain the same acoustical energy as the time-varying sound level during the same time period. The 1-hour A-weighted  $L_{eq}$ , the energy average of the A-weighted sound levels occurring during a 1-hour period, is the basis for the County's noise policies and standards.

People are generally more sensitive and annoyed by noise occurring during the evening and nighttime hours. Thus, another noise descriptor used in community noise assessments—the Community Noise Equivalent Level (CNEL)—was introduced. The CNEL scale represents a time-weighted, 24-hour average noise level based on the A-weighted sound level. The CNEL accounts for the increased noise sensitivity during the evening hours (7 p.m. to 10 p.m.) and nighttime hours (10 p.m. to 7 a.m.) by adding 5 dBA and 10 dBA, respectively, to the average sound levels occurring during the evening and nighttime hours.

## 2.6 Sound Propagation

Sound propagation (i.e., the passage of sound from a noise source to a receiver) is influenced by geometric spreading, ground absorption, atmospheric effects, and shielding by natural and/or built features.

Sound levels attenuate (or diminish) at a rate of approximately 6 dBA per doubling of distance from an outdoor point source due to the geometric spreading of the sound waves. Atmospheric conditions such as humidity, temperature, and wind gradients can also temporarily increase or decrease sound levels. In general, the greater the distance the receiver is from the source, the greater the potential for variation in sound levels due to atmospheric effects. Additional sound attenuation can result from built features such as intervening walls and buildings, and by natural features such as hills and dense woods.

## 2.7 Groundborne Vibration Fundamentals

Groundborne vibration is a small, rapidly fluctuating motion transmitted through the ground. The strength of groundborne vibration attenuates fairly rapidly over distance. Some soil types transmit vibration quite efficiently; other types (primarily sandy soils) do not. Several basic measurement units are commonly used to describe the intensity of ground vibration. The descriptors used by the Federal Transit Administration are peak particle velocity (PPV), in units of inches per second, and velocity decibel (VdB).

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The calculation to determine PPV at a given distance is as follows:

$$PPV_{\text{distance}} = PPV_{\text{ref}} * (25/D)^{1.5}$$

Where:

*PPV<sub>distance</sub> = the peak particle velocity in inches per second of the equipment adjusted for distance*  
*PPV<sub>ref</sub> = the reference vibration level in inches per second at 25 feet*

*D = the distance from the equipment to the receiver*

The velocity parameter (instead of acceleration or displacement) best correlates with human perception of vibration. Thus, the response of humans, buildings, and sensitive equipment to vibration is described in this section in terms of the root-mean square velocity level in VdB units relative to 1 micro-inch per second. As a point of reference, the average person can just barely perceive vibration velocity levels below 70 VdB (typically in the vertical direction). The calculation to determine the root-mean square at a given distance is as follows:

$$L_v(D) = L_v(25 \text{ feet}) - 30 * \log(D/25)$$

Where:

*L<sub>v</sub>(D) = the vibration level at the receiver*

*L<sub>v</sub>(25 feet) = the reference source vibration level*

*D = the distance from the vibration activity to the receiver*

Typical background vibration levels are between 50 and 60 VdB, and the level for minor cosmetic damage to fragile buildings or blasting generally begins at 100 VdB.



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## **3 APPLICABLE NOISE REGULATIONS AND STANDARDS**

The County has adopted various noise policies and standards contained within its General Plan Noise Element and Noise Ordinance. The City of Chula Vista (City) has adopted noise standards as well as performance standards and noise control measures, contained within the City's General Plan Environmental Element and the City's Noise Ordinance, respectively. The previously mentioned jurisdictions' noise policies and standards are summarized below.

### **County of San Diego General Plan, Noise Element**

The County's General Plan Noise Element establishes noise and land use compatibility standards and outlines goals and policies to achieve these standards. The Noise Element characterizes the noise environment in the County and provides the context for the County's noise/land use compatibility guidelines and standards. The Noise Element also describes the County's goals for achieving the standards and introduces policies designed to implement the goals. Under implementation of the General Plan, the County would use the Noise Compatibility Guidelines to determine the compatibility of land uses when evaluating proposed development projects. The Noise Compatibility Guidelines indicate ranges of compatibility and are intended to be flexible enough to apply to a range of projects and environments.

A land use located in an area identified as "acceptable" indicates that standard construction methods would attenuate exterior noise to an acceptable indoor noise level and that people can carry out outdoor activities with minimal noise interference. Land uses that fall into the "conditionally acceptable" noise environment should have an acoustical study that considers the type of noise source, the sensitivity of the noise receptor, and the degree to which the noise source has the potential to interfere with sleep, speech, or other activities characteristic of the land use. For land uses indicated as "conditionally acceptable," structures must be able to attenuate the exterior noise to the indoor noise level as indicated in the Noise Compatibility Guidelines. For land uses where the exterior noise levels fall within the "unacceptable" range, new construction generally should not be undertaken (County of San Diego 2011a).

### **San Diego County Code of Regulatory Ordinances**

The Noise Ordinance (Title 3, Division 6, Chapter 4, Sections 36.401–36.435, Noise Ordinance) establishes prohibitions for disturbing, excessive, or offensive noise as well as provisions such as sound level limits for the purpose of securing and promoting the public health, comfort, safety, peace, and quiet for its citizens. Planned compliance with sound level limits and other specific parts of the ordinance allows presumption that the noise is not disturbing, excessive, or offensive. Limits are specified depending on the zoning placed on a property (e.g., varying

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densities and intensities of residential, industrial, and commercial zones). Where two adjacent properties have different zones, the sound level limit at a location on a boundary between two properties is the arithmetic mean of the respective limits for the two zones, except for extractive industries. It is unlawful for any person to cause or allow the creation of any noise that exceeds the applicable limits of the Noise Ordinance at any point on or beyond the boundaries of the property on which the sound is produced.

Section 36.404 of the Noise Ordinance contains sound level limits specific to receiving land uses. Sound level limits are in terms of a 1-hour average sound level. The allowable noise limits depend upon the County's zoning district and time of day. The Land Exchange Alternative would be located within Specific Plan Area and Open Space zones. Table 3 lists the sound level limits for the County.

**Table 3**  
**San Diego County Noise Ordinance Sound Level Limits**

Zone	Applicable Limit 1-Hour Average Sound Level (dB)		
	7 a.m. to 7 p.m.	7 p.m. to 10 p.m.	10 p.m. to 7 a.m.
(1) RS, RD, RR, RMH, A70, A72, S80, S81, S87, S90, S92, RV, and RU with a density of less than 11 dwelling units per acre	50	50	45
(2) RRO, RC, RM, C30, S86, V5 and RV and RU with a density of 11 or more dwelling units per acre	55	55	50
(3) S94, V4, all other commercial zones	60	60	55
(4) V1, V2	60	55	see below
V1	60	55	55
V2	60	55	50
V3	70	70	65
(5) M50, M52, M54	70	70	70
(6) S82, M56, and M58	75	75	75
(7) S88 (see note 4 below)	—	—	—

**Source:** County of San Diego 2011b.

RS, RD, RM, RR, RU, RV, RRO, RMH, RU = Residential uses; A70, A72 = Agricultural uses; S80, S81, S82, S87, S90 = Open space uses, ecological resource areas, or holding area uses; S92 = General rural uses; RC = Residential/commercial uses; C30 = Commercial uses; S86 = parking uses; V1, V2, V3, V4, V5 = Village uses; M50, M52, M54, M56, M58 = Manufacturing and industrial uses; S88 = Special planning area uses.

<sup>1</sup> If the measured ambient level exceeds the applicable limit noted in the table, the allowable 1-hour average sound level will be the ambient noise level. The ambient noise level will be measured when the alleged noise violation source is not operating.

<sup>2</sup> The sound-level limit at a location on a boundary between two zoning districts is the arithmetic mean of the respective limits for the two districts; provided, however, that the 1-hour average sound-level limit applicable to extractive industries, including but not limited to borrow pits and mines, will be 75 dB at the property line, regardless of the zone where the extractive industry is actually located.

<sup>3</sup> Fixed-location, public utility distribution or transmission facilities located on or adjacent to a property line shall be subject to the noise-level limits of this section, measured at or beyond 6 feet from the boundary of the easement upon which the equipment is located.

<sup>4</sup> S88 zones are Specific Planning Areas, which allow different uses. The sound level limits present in Table 2 that apply in an S88 zone depend on the use being made of the property. The limits in Table 2, subsection (1) apply to a property with a residential, agricultural, or civic use. The limits in subsection (3) apply to a property with a commercial use. The limits in subsection (5) apply to a property with an industrial use that would only be allowed in an M50, M52, or M54 zone. The limits in subsection (6) apply to all property with an extractive use or a use that would only be allowed in an M56 or M58 zone.

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Section 36.408 of the Noise Ordinance sets limits on the time of day and days of the week that construction can occur, as well as setting noise limits for construction activities. In summary, the Noise Ordinance prohibits operating construction equipment on the following days and times:

- Mondays through Saturdays except between the hours of 7 a.m. and 7 p.m.
- Sundays or a holiday. A holiday means January 1st, the last Monday in May, July 4th, the first Monday in September, December 25th, and any day appointed by the President as a special national holiday or the Governor of the state as a special state holiday.

In addition, Section 36.409 requires that between the hours of 7 a.m. and 7 p.m., no equipment shall be operated so as to cause an 8-hour average construction noise level in excess of 75 dBA when measured at the boundary line of the property where the noise source is located, or on any occupied property where the noise is being received.

Although the Land Exchange Area is located within unincorporated San Diego County, the project is adjacent to the City of Chula Vista, and the majority of project-related traffic is predicted to travel along City's arterial roads, coming to and from the Land Exchange Area. For this reason, City noise regulations are included here and are used in the assessment of off-site impacts to noise-sensitive land uses located in Chula Vista.

### City of Chula Vista General Plan Environmental Element

The City's General Plan Environmental Element illustrates the City's exterior land use–noise compatibility guidelines, which are shown in Table 4. These guidelines reflect the levels of noise exposure that are generally considered to be compatible with various types of land uses.

**Table 4**  
**City of Chula Vista Exterior Land Use–Noise Compatibility Guidelines**

Land Use	Annual Community Noise Equivalent Level in Decibels					
	50	55	60	65	70	75
Residential						
Schools, libraries, daycare facilities, convalescent homes, outdoor use areas, and other similar uses considered noise sensitive						
Neighborhood parks, playgrounds						
Community parks, athletic fields						
Offices and professionals						
Places of worship (excluding outdoor use areas)						
Golf courses						

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**Table 4**  
**City of Chula Vista Exterior Land Use–Noise Compatibility Guidelines**

Land Use	Annual Community Noise Equivalent Level in Decibels					
	50	55	60	65	70	75
Retail and wholesale commercial, restaurants, movie theaters						
Industrial, manufacturing						

Source: City of Chula Vista 2005.

### City of Chula Vista Performance Standards and Noise Control

Chapter 19.68 of the City of Chula Vista’s Zoning Code provides the City’s performance standards and noise control ordinance.

Section 19.68.030 of the City’s Noise Ordinance contains exterior noise limits specific to receiving land uses. The allowable noise limits depend upon the City’s zoning district and time of day. Table 5 lists the exterior noise limits for the City, and Table 6 lists the interior noise limits for the City.

**Table 5**  
**City of Chula Vista Exterior Noise Limits**

Receiving Land Use Category	Noise Level (dBA)	
	10 p.m. to 7 a.m. (Weekdays)	7 a.m. to 10 p.m. (Weekdays)
	10 p.m. to 8 a.m. (Weekends)	8 a.m. to 10 p.m. (Weekends)
All residential (except multiple dwelling)	45	55
Multiple dwelling residential	50	60
Commercial	60	65
Light industry – I-R and I-L zone	70	70
Heavy industry – I zone	80	80

Source: City of Chula Vista 1985.

dBA = A-weighted decibel; I-R = Research Industrial zone; I-L = Limited Industrial zone; I = General Industrial zone

**Table 6**  
**City of Chula Vista Interior Noise Limits**

Type of Land Use	Time Interval	Noise Level (dBA) not to be Exceeded		
		Anytime	1 minute in 1 hour	5 minutes in 1 hour
Multifamily	10 p.m. – 7 a.m.	45	40	35
Residential	7 a.m. – 10 p.m.	55	50	45

Source: City of Chula Vista 1985.

dBA = A-weighted decibel

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### **City of Chula Vista Municipal Code**

Title 17 of the Chula Vista Municipal Code (Environmental Quality), Chapter 24, addresses managing noisy and disorderly conduct. Section 17.24.040.C.8 specifically addresses restrictions against generation of construction noise in overnight periods. The use of any tools, power machinery, or equipment, or the conduct of construction and building work in residential zones so as to cause noises disturbing to the peace, comfort, and quiet enjoyment of property of any person residing or working in the vicinity, shall be prohibited between 10 p.m. and 7 a.m., Monday through Friday, and between 10 p.m. and 8 a.m., Saturday and Sunday, except when the work is necessary for emergency repairs required for the health and safety of any member of the community (City of Chula Vista 2010).

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## **4 ENVIRONMENTAL SETTING, EXISTING AND POTENTIAL FUTURE CONDITIONS**

### **4.1 Geographical Setting and Surrounding Land Uses**

The Land Exchange Area is currently undeveloped with on-site elevation ranging from approximately 600 feet above mean sea level at the southern end of the property to approximately 1,200 feet above mean sea level in the northeastern portion of the Land Exchange Alternative area. The site is diverse in topography and contains a flat valley along Proctor Valley Road and rolling hills within the remainder of the Land Exchange Area. The Land Exchange Area is bordered by the San Miguel and Jamul Mountains immediately to the northwest and southeast, with the foothills of these mountains encroaching into the Land Exchange Area. The eastern portions of Planning Area 16 are located within portions of the Jamul Mountains and contain the highest elevations.

The existing residential communities of Bella Lago, Rolling Hills Ranch, and Eastlake Vistas are located approximately 3,100 feet, 4,500 feet, and 12,000 feet southwest of the Land Exchange Area, respectively. Upper and Lower Otay Lake and the proposed Otay Ranch Village 13 Master Planned Community Resort development are located approximately 6,000 feet south of the Land Exchange Area. The City of San Diego's MSCP "Cornerstone Lands" are located adjacent to the Land Exchange Area to the south.

To the northeast of the Land Exchange Area lies the community of Jamul and to the northwest, Rancho San Diego. Most of the land in the vicinity of the Land Exchange Area to the west and east is vacant; some of it consists of gently rolling hills used for agriculture and grazing, with the balance being more rugged, steep open space. Development is primarily concentrated around Rancho San Diego to the north and the rural community of Jamul to the northeast. Jamul includes primarily large-lot estates, horse ranches, and agriculture.

The 11,152-acre San Diego National Wildlife Refuge is located to the west of the Land Exchange Area. The San Diego National Wildlife Refuge stretches from Jamul to communities in Spring Valley and eastern Chula Vista. The San Diego National Wildlife Refuge is the U.S. Fish and Wildlife's contribution to the MSCP Preserve. The approximately 5,600-acre Rancho Jamul Ecological Reserve is also a component of the San Diego MSCP and is owned and managed by the California Department of Fish and Wildlife. These state-owned lands are adjacent to with the Land Exchange Area, with a large block of habitat located to the east of the Land Exchange Area.

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The Bureau of Land Management manages two separate parcels within the northern portion of the Proctor Valley Parcel of Otay Ranch. The large northern out parcel encompasses the Callahan Mountain Peak and some of the tops of side-slopes extending down from the peak.

### **4.2 Existing Noise Conditions**

The primary existing noise source within the Land Exchange Area is vehicular traffic along Proctor Valley Road. Proctor Valley Road is a two-lane, partially improved road. The existing traffic volume within the Land Exchange Area is approximately 200 average daily traffic (ADT) (Chen Ryan Associates 2017). No other noise sources potentially affecting the Land Exchange Alternative have been identified.

There are no existing Noise Sensitive Land Uses (NSLUs) immediately adjacent to the Land Exchange Area. The nearest existing NSLUs to the Land Exchange Area are single-family residences in the Bella Lago community, located approximately 3,100 feet to the west, and single-family residences near the southwest boundary of Jamul, located approximately 3,700 feet to the north.

### **4.3 Potential Build-Out Noise Conditions**

Proctor Valley Road would be the primary traffic noise source. It is predicted to have a Year 2030 traffic volume of up to 6,000 ADT without the Land Exchange Alternative and 17,900 ADT with the Land Exchange Alternative (Chen Ryan Associates 2017).

### **4.4 Methodology and Equipment**

#### **4.4.1 Noise Measuring Methodology and Procedures**

The existing noise environment in the Land Exchange Area was measured on May 6, 2015. The noise measurements were taken with calibrated Rion NL 32 integrating sound level meters using A-weighting and “slow” response settings. The sound level meters are equipped with 0.5-inch pre-polarized condenser microphone and pre-amplifier. The sound level meters meet the current American National Standards Institute standard for a Type 1 precision sound level meter. The sound level meters were positioned at a height of approximately 5 feet above the ground during the noise measurements. Eleven noise measurement locations that represent key potential sensitive receptors or sensitive land uses were selected along Proctor Valley Road within the Land Exchange Area and adjacent to other roadways projected to carry potentially significant Land Exchange Alternative traffic volumes. These locations are depicted as M1 through M11 on Figure 4, Noise Measurement Locations. A description of the noise measurement locations and the results of the noise measurements is presented in Table 7. Field notes and photos are provided in Appendix A.



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**Table 7**  
**Noise Measurement Results**

Receptors	Date	Time	Description	Leq (dBA)	Lmax (dBA)
M1	May 6, 2015	3:54–4:14 p.m.	Open space area along the east side of Proctor Valley Road, approximately 60 feet from the center line	49.1	68.0
M2	May 6, 2015	3:11–3:31 p.m.	Open space area along the east side of Proctor Valley Road, approximately 50 feet from the center line	50.7	69.5
M3	May 6, 2015	2:35–2:55 p.m.	Open space area along the east side of Proctor Valley Road, approximately 165 feet from the center line	50.7	67.6
M4	May 6, 2015	4:35–4:55 p.m.	790 Lake House Place Chula Vista, California 91914 – Residence elevated from Proctor Valley Road	47.3	62.2
M5	May 6, 2015	5:47–6:07 p.m.	Pedestrian walkway northeast of 606 San Marino Place Chula Vista, California 91914 – Elevated from Proctor Valley Road	66.4	72.7
M6	May 6, 2015	6:24–6:44 p.m.	2335 Paseo Veracruz Chula Vista, California 91914 – Park on a lower elevation than Mount Miguel Road	55.1	61.9
M7	May 6, 2015	5:13–5:33 p.m.	704 Pueblo Place Chula Vista, California 91914 – Residence elevated from Lane Avenue	53.4	60.6
M8	May 6, 2015	1:58–2:18 p.m.	2852 Shadow Valley Jamul, California 91935 – In front of residence gate on dirt access road	53.8	72.1
M9	May 6, 2015	1:27–1:47 p.m.	13828 Proctor Valley Road Jamul, California 91935 – Residence driveway	50.8	63.1
M10	May 6, 2015	12:58–1:18 p.m.	3007 Calle Mesquite Jamul, California 91935 – Residence driveway	48.7	64.1
M11	May 6, 2015	12:15–12:35 p.m.	13939 Maxfield Road Jamul, California 91935	46.9	66.2

**Source:** Appendix A. Figure 4.

L<sub>eq</sub> = equivalent continuous sound level (time-averaged sound level); L<sub>max</sub> = maximum sound level during the measurement interval; dBA = A-weighted decibel

### 4.4.2 Noise Modeling Software

The vehicle noise level from Proctor Valley Road within the Land Exchange Area and along other roadway segments projected to carry potentially significant project traffic volumes was calculated using the Federal Highway Administration Traffic Noise Model (TNM) – TNM version 2.5 (FHWA 2004). TNM sound modeling input/output data are included in Appendix B.

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### 4.4.3 Noise Calculations

#### Traffic Noise Modeling Screening

Because of the size of the off-site traffic impact analysis area and the number of associated roadway segments, a preliminary screening analysis was performed to estimate the relative increase in traffic noise from the Land Exchange Alternative (Chen Ryan Associates 2017). Roadway segments with an estimated increase in noise levels of 0.5 dB or more based upon the ADT volumes (either in the Existing plus Project scenario or the Year 2030 with Project scenario) were modeled in detail using the TNM model to determine the potential for a significant noise impact. Roadway segments with an estimated increase in noise levels of less than 0.5 dB were not modeled using the TNM model. The off-site roadway segments and modeled receivers analyzed using TNM and the input data are listed in Table 8 and shown in Figure 5.

**Table 8  
Off-Site Roadway Segments (Modeled Receivers)**

Roadway	From / To (Jurisdiction)	Modeled Receiver	Average Traffic Speed (mph)	Existing Traffic Volume for CNEL (ADT)	Existing plus Project Traffic Volume for CNEL (ADT)	Year 2030 <sup>c</sup> Traffic Volume for CNEL (ADT)	Year 2030 <sup>c</sup> plus Project Traffic Volume for CNEL (ADT)
San Miguel Ranch Road	Proctor Valley Road to State Route (SR)-125 southbound ramp (Chula Vista)	R1	45	8,300	9,600	13,600	14,700
San Miguel Ranch Road / Mt. Miguel Road	SR-125 northbound ramp to Proctor Valley Road (Chula Vista)	R2, R13	40	10,100	11,400	9,700	10,800
Proctor Valley Road	SR-125 northbound ramps to Mt. Miguel Road (Chula Vista)	R3	45	21,700	26,300	25,700	31,100
Proctor Valley Road	Mt. Miguel Road to Lane Avenue (Chula Vista)	R4	45	20,000	26,500	34,000	40,900
Proctor Valley Road	Lane Ave to Hunte Parkway (Chula Vista)	R6	45	14,200	24,200	21,900	30,900
Lane Avenue	Proctor Valley Road to Otay Lakes Road (Chula Vista)	R5	40	10,800	11,500	12,700	14,500

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**Table 8**  
**Off-Site Roadway Segments (Modeled Receivers)**

Roadway	From / To (Jurisdiction)	Modeled Receiver	Average Traffic Speed (mph)	Existing Traffic Volume for CNEL (ADT)	Existing plus Project Traffic Volume for CNEL (ADT)	Year 2030 <sup>c</sup> Traffic Volume for CNEL (ADT)	Year 2030 <sup>c</sup> plus Project Traffic Volume for CNEL (ADT)
Hunte Parkway	Proctor Valley Road to Otay Lakes Road (Chula Vista)	R7	45	6,300	9,100	9,100	11,600
Hunte Parkway	Otay Lakes Road to Olympic Parkway (Chula Vista)	R8	45	10,900	12,400	17,200	18,700
Hunte Parkway	Olympic Parkway to Eastlake Parkway (Chula Vista)	R9	50	2,000	2,400	35,000	35,400
Proctor Valley Road	Hunte Parkway to Northwood Drive (Chula Vista)	R10, R12	45	5,800	16,400 <sup>b</sup>	14,800	26,500
Northwoods Drive	Proctor Valley Road to Blue Ridge Drive (Chula Vista)	R11	45	1,400	2,000	400	1,200
Proctor Valley Road	Land Exchange Alternative Driveway No. 9 to Melody Road (San Diego County)	R14	25 (existing) / 45 (future) <sup>a</sup>	200	1,200 <sup>b</sup>	6,000	7,000
Proctor Valley Road	Melody Road to Schlee Canyon Road (San Diego County)	R15	45	1,700	2,400	5,200	5,600
Melody Road	Proctor Valley Road to SR-94 (San Diego County)	R16	40	300	600 <sup>b</sup>	4,500	4,600
Proctor Valley Road	Schlee Canyon Road to Maxfield Road (San Diego County)	R17	40	2,100	2,500	5,200	5,500
Proctor Valley Road	Maxfield Road to SR-94 (San Diego County)	R18	40	2,500	3,100	5,200	5,500

mph = miles per hour; CNEL = Community Noise Equivalent; ADT = average daily traffic; R = Residential

<sup>a</sup> Because Proctor Valley Road is currently unpaved in this area, the speed limit is 25 mph. In the cumulative future (Year 2030) scenarios, Proctor Valley Road would be fully paved, and it is anticipated that the speed limit would be the same as the adjoining roadway segments.

<sup>b</sup> Existing plus Project traffic volumes would result in more than double the existing traffic volume along this segment. There is a potential for a direct noise impact.

<sup>c</sup> Year 2030 conditions represent the project long-range cumulative conditions for 2030 pursuant to the Traffic Study prepared by Chen Ryan Associates (2017).

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Modeled vehicle speeds were based upon the posted speed limits. The modeled vehicle mix of 97% automobiles, 2% medium trucks, and 1% buses was based upon the vehicle counts conducted in concurrence with the field noise measurements.

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## 5 NOISE SENSITIVE LAND USES

### Guidelines for the Determination of Significance

#### *County of San Diego*

Based upon the County's *Guidelines for Determining Significance: Noise* (County of San Diego 2009a), the Land Exchange Alternative would result in a significant noise impact if it would result in the exposure of any on- or off-site, existing, or reasonably foreseeable future NSLU to exterior or interior noise in excess of any of the following:

#### A. Exterior Locations:

- i. 60 dB (CNEL) (Single-Family Residential); 65 dB (CNEL) (Multi-Family Residential, Mixed-Use, Schools, Passive Recreation Parks etc.); or
- ii. An increase of 10 dB (CNEL) over pre-existing noise.

In the case of single-family residential detached NSLUs, exterior noise shall be measured at an outdoor living area which adjoins and is on the same lot as the dwelling, and which contains at least the following minimum area:

1. Net lot area up to 4,000 square feet: 400 square feet
2. Net lot area 4,000 square feet to 10 acres: 10% of net lot area
3. Net lot area over 10 acres: 1 acre.

For all other projects, exterior noise shall be measured at all exterior areas provided for group or private usable open space.

#### B. Interior Locations:

45 dB (CNEL) except for the following cases:

- i. Rooms which are usually occupied only a part of the day (schools, libraries, or similar facilities), the interior one-hour average sound level due to noise outside should not exceed 50 dB(A).
- ii. Corridors, hallways, stairwells, closets, bathrooms, or any room with a volume less than 490 cubic feet.

As previously noted, a substantial noise increase is defined as an increase of 10 dBA CNEL above existing conditions, as stated in the County's *Guidelines for Determining Significance: Noise*, Section 4.1-A(ii). However, the County's *Report Format and Content Requirements: Noise*, Section 2.3, includes a statement that a "doubling of sound energy" is considered a significant impact at a "documented noisy site" (County of San Diego 2009b). A doubling of sound energy is

## **Acoustical Analysis Report for Otay Ranch Village 14 and Planning Areas 16/19 – Land Exchange EIR Alternative**

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equivalent to a 3 dBA increase. Based on the County's Noise Compatibility Guidelines (Table N-1) and related Noise Standards (Table N-2) in the County's General Plan Noise Element, a documented noisy site is a location with NSLUs that currently exceeds 60 dBA CNEL in the case of single-family residences, 65 dBA CNEL in the case of multifamily or mixed-use residences, or 70 dBA in the case of office/professional uses.

Thus, a substantial increase is defined as a 10 dBA increase, or greater, over existing noise levels when existing and future noise levels are below the County's General Plan Noise Compatibility Guidelines and Noise Standards, or a 3 dBA increase when existing or future noise levels equal or exceed the County's General Plan Compatibility Guidelines and Noise Standards.

### ***Cumulative Noise Impact Criteria***

Based on the guidance contained in the County's *Report Format and Content Requirements: Noise* (County of San Diego 2009b):

Cumulative noise impacts may occur in discretionary applications where other permitted or planned projects will combine to exceed the standards of the Noise Element. It is more likely to occur in locations where existing noise levels are elevated or approach the applicable criterion of 60 dBA CNEL for an exterior noise sensitive land use (NSLU).

Further:

Mitigation measures are required to reduce potential 'Cumulatively Considerable' impacts. Evaluation of mitigation feasibility and limitations shall be addressed in association with their implementation. A 'cumulatively considerable' contribution requiring mitigation or design measures is identified whenever ... more than a one decibel increase from the project was identified in the model analysis.

By inference, "more than a one decibel increase" implies a 2 dBA or greater increase (when comparing Existing plus Cumulative versus Existing plus Cumulative plus Project).

### ***City of Chula Vista***

Based upon the City's noise guidelines and ordinance, the Land Exchange Alternative would result in a significant noise impact if it would result in the exposure of any on- or off-site, existing, or reasonably foreseeable future NSLU within the City's corporate boundaries to noise levels exceeding the exterior land use-noise compatibility guidelines outlined in Table 4, or to exterior/interior noise levels exceeding the limits set forth in Tables 5 and 6.

# Acoustical Analysis Report for Otay Ranch Village 14 and Planning Areas 16/19 – Land Exchange EIR Alternative

## 6 ANALYSIS OF PROJECT EFFECTS AND POTENTIAL NOISE IMPACTS

### 6.1 On-Site Traffic Noise

In the future, vehicular traffic on Proctor Valley Road is anticipated to be the primary noise source that would affect the Land Exchange Area. Using TNM, the Future (Year 2030) plus Project traffic noise levels were modeled for locations representative of the exterior living areas (i.e., future rear yards, side yards, patios) of the parcels along Proctor Valley Road. The modeled on-site receiver locations are shown in Figure 6.

The results of the noise modeling conducted for the proposed on-site NSLUs under the Future plus Project scenarios are shown in Table 9. The TNM sound modeling input/output data is included in Appendix B.

**Table 9**  
**Modeled On-Site Ground-Floor Traffic Noise Levels (dBA CNEL)**

Receiver	Land Use	County of San Diego Exterior Noise Standard	Future (Year 2030) plus Land Exchange Alternative	County of San Diego Noise Standard <sup>a</sup> Exceeded?
R19 P-2 Park	Park	65	61	No
R20 Lot 21 R-1	Single-family residential	60	58	No
R21 Lot 15 R-1	Single-family residential	60	66	Yes
R22 Lot 6 R-1	Single-family residential	60	66	Yes
R23 Lot 4 R-1	Single-family residential	60	67	Yes
R24 Lot 15 R-5	Single-family residential	60	59	No
R25 Lot 13 R-5	Single-family residential	60	62	Yes
R26 Lot 8 R-5	Single-family residential	60	65	Yes
R27 Lot 2 R-5	Single-family residential	60	67	Yes
R28 Lot 2 R-4	Single-family residential	60	64	Yes
R29 Lot 7 R-4	Single-family residential	60	63	Yes
R30 Lot 15 R-4	Single-family residential	60	63	Yes
R31 P-4 Park	Park	65	64	No
R32 MF-1	Multifamily residential	65	63	No
R33 MF-1	Multifamily residential	65	63	No
R34 FS-1	Public safety (fire station)	65	64	No
R35 MU-1/CF-1	Mixed-use / commercial	65	61	No
R36 P-1 Park	Park	65	56	No
R37 S-1 School	School	65	64	No
R38 Lot 38 R-10	Single-family residential	60	63	Yes
R39 Lot 45 R-10	Single-family residential	60	62	Yes
R40 Lot 32 R-10	Single-family residential	60	64	Yes

## Acoustical Analysis Report for Otay Ranch Village 14 and Planning Areas 16/19 – Land Exchange EIR Alternative

**Table 9**  
**Modeled On-Site Ground-Floor Traffic Noise Levels (dBA CNEL)**

Receiver	Land Use	County of San Diego Exterior Noise Standard	Future (Year 2030) plus Land Exchange Alternative	County of San Diego Noise Standard <sup>a</sup> Exceeded?
R41 Lot 19 R-11	Single-family residential	60	64	Yes
R42 Lot 13 R-11	Single-family residential	60	63	Yes
R43 Lot 2 R-11	Single-family residential	60	63	Yes
R44 Lot MF-2	Multifamily residential	65	62	No
R45 Lot MF-2	Multifamily residential	65	62	No
R46 Lot MF-2	Multifamily residential	65	62	No
R47 Lot 35 R-12	Single-family residential	60	58	No
R48 Lot 43 R-12	Single-family residential	60	65	Yes
R49 Lot R-14	Single-family residential	60	65	Yes
R50 Lot 3 R-12	Single-family residential	60	58	No
R51 Lot 8 R-12	Single-family residential	60	63	Yes
R52 Lot 38 R-13	Single-family residential	60	57	No
R53 Lot 10 R-15	Single-family residential	60	64	Yes
R54 Lot 12 R-15	Single-family residential	60	58	No

dBa = A-weighted decibels; CNEL = Community Noise Equivalent Level; R = Residential; P = Park; MF = Multifamily; FS = Fire Station; S = School

<sup>a</sup> 60 dBA CNEL for single-family residential, 65 dBA CNEL for multifamily residential, mixed-use, fire station, parks and schools.

The traffic noise modeling results indicate that Future plus Project traffic noise levels would exceed the County's exterior noise standard of 60 dBA CNEL at most of the single-family outdoor residential living areas, unless mitigation is provided. Noise levels at the proposed multifamily residential, fire station, school site, parks, and the mixed-use area would not exceed the County's 65 dBA CNEL noise standard.

For the single-family residences found to be in excess of the 60 dBA CNEL noise standard, mitigation measures were analyzed in the form of solid noise barriers, using the TNM v 2.5 traffic noise model. The results of the noise modeling with 6-foot-high noise barriers is shown in Table 10. The locations of the proposed noise barriers are shown in Figure 7, Soundwall Locations. As shown in Table 10, with 6-foot-high noise barriers located at the property boundaries fronting along Proctor Valley Road, all residential use land uses would be in conformance with County transportation noise standards. The details of the required noise barriers are included in Section 11.2, Mitigation Measures.



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**Table 10**  
**Modeled On-Site Ground-Floor Traffic Noise Levels (dBA CNEL) with Noise Barriers**

Receiver	Land Use Type	County of San Diego Exterior Noise Standard	Future (Year 2030) plus Land Exchange Alternative without Mitigation	County of San Diego Noise Standard <sup>a</sup> Exceeded?	Future (Year 2030) plus Land Exchange Alternative with Mitigation (6-Foot-High Noise Barriers)	County of San Diego Noise Standard <sup>a</sup> Exceeded with Mitigation?
R19 P-2 Park	Park	65	61	No	N/A	N/A
R20 Lot 21 R-1	Single-family residential	60	58	No	N/A	N/A
R21 Lot 15 R-1	Single-family residential	60	66	Yes	56	No
R22 Lot 6 R-1	Single-family residential	60	66	Yes	56	No
R23 Lot 4 R-1	Single-family residential	60	67	Yes	56	No
R24 Lot 15 R-5	Single-family residential	60	59	No	50	No
R25 Lot 13 R-5	Single-family residential	60	62	Yes	53	No
R26 Lot 8 R-5	Single-family residential	60	65	Yes	55	No
R27 Lot 2 R-5	Single-family residential	60	67	Yes	58	No
R28 Lot 2 R-4	Single-family residential	60	64	Yes	56	No
R29 Lot 7 R-4	Single-family residential	60	63	Yes	54	No
R30 Lot 15 R-4	Single-family residential	60	63	Yes	54	No
R31 P-4 Park	Park	65	64	No	N/A	N/A
R32 MF-1	Multifamily residential	65	63	No	N/A	N/A
R33 MF-1	Multifamily residential	65	63	No	N/A	N/A
R34 FS-1	Public safety (fire station)	65	64	No	N/A	N/A
R35 MU-1/CF-1	Mixed-use / commercial	65	61	No	N/A	N/A
R36 P-1 Park	Park	65	56	No	N/A	N/A
R37 S-1 School	School	65	64	No	N/A	N/A
R38 Lot 38 R-10	Single-family residential	60	63	Yes	54	No
R39 Lot 45 R-10	Single-family residential	60	62	Yes	54	No
R40 Lot 32 R-10	Single-family residential	60	64	Yes	54	No
R41 Lot 19 R-11	Single-family residential	60	64	Yes	53	No
R42 Lot 13 R-11	Single-family residential	60	63	Yes	53	No
R43 Lot 2 R-11	Single-family residential	60	63	Yes	52	No
R44 Lot MF-2	Multifamily residential	65	62	No	N/A	N/A
R45 Lot MF-2	Multifamily residential	65	62	No	N/A	N/A
R46 Lot MF-2	Multifamily residential	65	62	No	N/A	N/A
R47 Lot 35 R-12	Single-family residential	60	58	No	N/A	N/A
R48 Lot 43 R-12	Single-family residential	60	65	Yes	56	No
R49 Lot R-14	Single-family residential	60	65	Yes	55	No
R50 Lot 3 R-12	Single-family residential	60	58	No	N/A	N/A
R51 Lot 8 R-12	Single-family residential	60	63	Yes	54	No

## Acoustical Analysis Report for Otay Ranch Village 14 and Planning Areas 16/19 – Land Exchange EIR Alternative

**Table 10**  
**Modeled On-Site Ground-Floor Traffic Noise Levels (dBA CNEL) with Noise Barriers**

Receiver	Land Use Type	County of San Diego Exterior Noise Standard	Future (Year 2030) plus Land Exchange Alternative without Mitigation	County of San Diego Noise Standard <sup>a</sup> Exceeded?	Future (Year 2030) plus Land Exchange Alternative with Mitigation (6-Foot-High Noise Barriers)	County of San Diego Noise Standard <sup>a</sup> Exceeded with Mitigation?
R52 Lot 38 R-13	Single-family residential	60	57	No	N/A	N/A
R53 Lot 10 R-15	Single-family residential	60	64	Yes	54	No
R54 Lot 12 R-15	Single-family residential	60	58	No	N/A	N/A

dBA = A-weighted decibel; CNEL = Community Noise Equivalent Level; R = Residential; P = Park; N/A = not applicable; no mitigation required at this location; MF = Multifamily; FS = Fire Station; MU = Multi-Use; CF = Commercial ; S = School

<sup>a</sup> 60 dBA CNEL for single-family residential, 65 dBA CNEL for multifamily residential, mixed-use, fire station, parks, and school.

The noise levels at second-floor level façades<sup>2</sup> of the proposed residences facing Proctor Valley Road are shown in Table 11. As shown, noise levels at under the Future plus Project scenario would exceed the County’s exterior noise standard at 22 of the 32 modeled representative second-floor level receivers, resulting in a **potentially significant** traffic noise impact. Noise mitigation is provided in Section 11, Project Design Features and Mitigation Measures.

**Table 11**  
**Modeled On-Site Second-Floor Traffic Noise Levels**

Receiver (Second-Floor Level) <sup>b</sup>	Land Use Type	County of San Diego CNEL Exterior Noise Standard (dB)	Future (Year 2030) plus Land Exchange Alternative	County of San Diego Noise Standard <sup>a</sup> Exceeded?
R20 Lot 21 R-1 2nd Floor	Single-family residential	60	59	No
R21 Lot 15 R-1 2nd Floor	Single-family residential	60	67	Yes
R22 Lot 6 R-1 2nd Floor	Single-family residential	60	67	Yes
R23 Lot 4 R-1 2nd Floor	Single-family residential	60	67	Yes
R24 Lot 15 R-5 2nd Floor	Single-family residential	60	60	No
R25 Lot 13 R-52nd Floor	Single-family residential	60	63	Yes
R26 Lot 8 R-5 2nd Floor	Single-family residential	60	66	Yes
R27 Lot 2 R-5 2nd Floor	Single-family residential	60	67	Yes
R28 Lot 2 R-4 2nd Floor	Single-family residential	60	64	Yes

<sup>2</sup> It is not known at this time which of the residential lots would have second floors and/or second-floor balconies facing Proctor Valley Road; second-floor noise exposures were conservatively assumed for all of the modeled on-site receiver locations.

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**Table 11**  
**Modeled On-Site Second-Floor Traffic Noise Levels**

Receiver (Second-Floor Level) <sup>b</sup>	Land Use Type	County of San Diego CNEL Exterior Noise Standard (dB)	Future (Year 2030) plus Land Exchange Alternative	County of San Diego Noise Standard <sup>a</sup> Exceeded?
R29 Lot 7 R-4 2nd Floor	Single-family residential	60	64	Yes
R30 Lot 15 R-4 2nd Floor	Single-family residential	60	64	Yes
R32 MF-1 2nd Floor	Multifamily residential	65	64	No
R33 MF-1 2nd Floor	Multifamily residential	65	64	No
R34 FS-1 2nd Floor	Public safety (fire station)	65	65	No
R35 MU-1/CF-1 2nd Floor	Mixed-use/Commercial	65	65	No
R38 Lot 38 R-10 2nd Floor	Single-family residential	60	64	Yes
R39 Lot 45 R-10 2nd Floor	Single-family residential	60	63	Yes
R40 Lot 32 R-10 2nd Floor	Single-family residential	60	65	Yes
R41 Lot 19 R-11 2nd Floor	Single-family residential	60	64	Yes
R42 Lot 13 R-11 2nd Floor	Single-family residential	60	65	Yes
R43 Lot 2 R-11 2nd Floor	Single-family residential	60	64	Yes
R44 Lot MF-2 2nd Floor	Multifamily residential	65	62	No
R45 Lot MF-2 2nd Floor	Multifamily residential	65	62	No
R46 Lot MF-2 2nd Floor	Multifamily residential	65	62	No
R47 Lot 35 R-12 2nd Floor	Single-family residential	60	65	Yes
R48 Lot 43 R-12 2nd Floor	Single-family residential	60	65	Yes
R49 Lot R-14 2nd Floor	Single-family residential	60	65	Yes
R50 Lot 3 R-12 2nd Floor	Single-family residential	60	65	Yes
R51 Lot 8 R-12 2nd Floor	Single-family residential	60	65	Yes
R52 Lot 38 R-13 2nd Floor	Single-family residential	60	63	Yes
R53 Lot 10 R-15 2nd Floor	Single-family residential	60	64	Yes
R54 Lot 12 R-15 2nd Floor	Single-family residential	60	59	No

dBA = A-weighted decibel; CNEL = Community Noise Equivalent Level; R = Residential; MF = Multifamily; FS = Fire Station; MU = Mixed Use; CF = Commercial

<sup>a</sup> 60 dBA CNEL for single-family residential, 65 dBA CNEL for multifamily residential, mixed-use, fire station.

<sup>b</sup> It is not known at this time which of the residential lots would have second floors and/or second-floor balconies facing Proctor Valley Road; second-floor noise exposures were conservatively assumed for all of the modeled on-site receiver locations.

The County requires that interior noise levels not exceed a CNEL of 45 dB. Typically, with the windows open, building shells provide approximately 15 dB of noise reduction. The second floor noise level would range from 59 to 67 dB CNEL at proposed residential lots. Therefore, without mitigation the interior noise level for habitable spaces in some cases would exceed the County's 45 dB CNEL interior noise criterion, resulting in a **potentially significant impact**. Noise mitigation is provided in Section 11.

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### **6.2 Off-Site Traffic Noise**

The Land Exchange Alternative would result in additional vehicle trips on adjoining roadways, which potentially could result in significant noise increases. As discussed in Section 4.4.3, Noise Calculations, the Existing, Existing plus Project, Future (Year 2030), and Future (Year 2030) plus Project traffic noise levels were modeled using TNM for representative NSLUs adjacent to roadways with a potential for a significant noise increase. The results of the noise modeling conducted for off-site NSLUs are shown in Table 12. The TNM sound modeling input/output data is included in Appendix B.

## Acoustical Analysis Report for Otay Ranch Village 14 and Planning Areas 16/19 – Land Exchange EIR Alternative

**Table 12**  
**Modeled Off-Site Traffic Noise Levels**

<b>Receiver: Location</b>	<b>Modeled Exterior Noise Levels (dBA CNEL)</b>										
	<i>Applicable Exterior Noise Standard (dBA CNEL)</i>	<i>Existing</i>	<i>Existing plus Land Exchange Alternative</i>	<i>Increase from Land Exchange Alternative</i>	<i>Noise Standard Exceedance as a result of the Land Exchange Alternative?</i>	<i>Significant Impact (Noise Standard Exceedance or Substantial Increase)?</i>	<i>Future (Year 2030)</i>	<i>Future (Year 2030) plus Land Exchange Alternative</i>	<i>Increase from Land Exchange Alternative</i>	<i>Noise Standard Exceedance as a result of the Land Exchange Alternative?</i>	<i>Significant Cumulative Impact (Noise Standard Exceedance or Substantial Increase)?</i>
R1: San Miguel Ranch Road; west of SR-125	65 (City of Chula Vista)	64	65	1	No	No	66	67	1	No	No
R2: Mt. Miguel Road.; Proctor Valley Road – San Miguel Ranch Road	65 (City of Chula Vista)	54	54	0	No	No	54	55	1	No	No
R3: Proctor Valley Road; SR125 – Mt. Miguel Road	65 (City of Chula Vista)	55	55	0	No	No	55	56	1	No	No
R4: Proctor Valley Road; Mt. Miguel Road – Lane Avenue	65 (City of Chula Vista)	59	60	1	No	No	61	62	1	No	No
R5: Lane Avenue: Proctor Valley Road – Otay Lakes Road	65 (City of Chula Vista)	54	55	1	No	No	55	56	1	No	No
R6: Proctor Valley Road; Lane Avenue – Hunte Parkway	65 (City of Chula Vista)	55	57	2	No	No	57	58	1	No	No

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**Table 12**  
**Modeled Off-Site Traffic Noise Levels**

<b>Receiver: Location</b>	<b>Modeled Exterior Noise Levels (dBA CNEL)</b>										
	<i>Applicable Exterior Noise Standard (dBA CNEL)</i>	<i>Existing</i>	<i>Existing plus Land Exchange Alternative</i>	<i>Increase from Land Exchange Alternative</i>	<i>Noise Standard Exceedance as a result of the Land Exchange Alternative?</i>	<i>Significant Impact (Noise Standard Exceedance or Substantial Increase)?</i>	<i>Future (Year 2030)</i>	<i>Future (Year 2030) plus Land Exchange Alternative</i>	<i>Increase from Land Exchange Alternative</i>	<i>Noise Standard Exceedance as a result of the Land Exchange Alternative?</i>	<i>Significant Cumulative Impact (Noise Standard Exceedance or Substantial Increase)?</i>
R7: Hunte Parkway; Proctor Valley Road – Otay Lakes Road	65 (City of Chula Vista)	52	54	2	No	No	54	55	1	No	No
R8: Hunte Parkway; Otay Lakes Road – Olympic Parkway	65 (City of Chula Vista)	57	58	1	No	No	59	60	1	No	No
R9: Hunte Parkway; Olympic Parkway – Eastlake Parkway	65 (City of Chula Vista)	47	48	1	No	No	59	59	0	No	No
R10: Proctor Valley Road; Hunte Parkway – Northwoods Drive	65 (City of Chula Vista)	50	54	4	No	No	53	56	3	No	No
R11: Northwoods Drive; Proctor Valley Road – Blue Ridge Drive	65 (City of Chula Vista)	50	52	2	No	No	48	52	4	No	No

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**Table 12**  
**Modeled Off-Site Traffic Noise Levels**

<b>Receiver: Location</b>	<b>Modeled Exterior Noise Levels (dBA CNEL)</b>										
	<i>Applicable Exterior Noise Standard (dBA CNEL)</i>	<i>Existing</i>	<i>Existing plus Land Exchange Alternative</i>	<i>Increase from Land Exchange Alternative</i>	<i>Noise Standard Exceedance as a result of the Land Exchange Alternative?</i>	<i>Significant Impact (Noise Standard Exceedance or Substantial Increase)?</i>	<i>Future (Year 2030)</i>	<i>Future (Year 2030) plus Land Exchange Alternative</i>	<i>Increase from Land Exchange Alternative</i>	<i>Noise Standard Exceedance as a result of the Land Exchange Alternative?</i>	<i>Significant Cumulative Impact (Noise Standard Exceedance or Substantial Increase)?</i>
M4 / R12: Proctor Valley Road west of Northwoods Drive	65 (City of Chula Vista)	51	55	4	No	No	55	57	2	No	No
M6 / R13: San Miguel Ranch Road east of SR- 125	65 (City of Chula Vista)	59	60	1	No	No	61	61	0	No	No
M8 / R14: Proctor Valley Road north of Land Exchange Alternative	60 (County of San Diego)	39	54	15	No	Yes (Substantial Increase)	60	61	1	Yes	No (less than 2 dB increase)
M9 / R15: Proctor Valley Road; Melody Road – Schlee Canyon Road	60 (County of San Diego)	49	51	2	No	No	54	55	1	No	No
M10 / R16: Melody Road; Proctor Valley Road – SR-94	60 (County of San Diego)	48	51	3	No	No	60	60	0	No	No

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**Table 12**  
**Modeled Off-Site Traffic Noise Levels**

<b>Receiver: Location</b>	<b>Modeled Exterior Noise Levels (dBA CNEL)</b>										
	<i>Applicable Exterior Noise Standard (dBA CNEL)</i>	<i>Existing</i>	<i>Existing plus Land Exchange Alternative</i>	<i>Increase from Land Exchange Alternative</i>	<i>Noise Standard Exceedance as a result of the Land Exchange Alternative?</i>	<i>Significant Impact (Noise Standard Exceedance or Substantial Increase)?</i>	<i>Future (Year 2030)</i>	<i>Future (Year 2030) plus Land Exchange Alternative</i>	<i>Increase from Land Exchange Alternative</i>	<i>Noise Standard Exceedance as a result of the Land Exchange Alternative?</i>	<i>Significant Cumulative Impact (Noise Standard Exceedance or Substantial Increase)?</i>
M11 / R17: Proctor Valley Road; Schlee Canyon Road – Maxfield Road	60 (County of San Diego)	57	58	1	No	No	61	61	0	No	No
R18: Proctor Valley Road; Maxfield Road – SR-94	60 (County of San Diego)	59	60	1	No	No	63	63	0	No	No

dBA = A-weighted decibel; CNEL = Community Noise Equivalent Level



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As shown on Table 12, the off-site traffic noise modeling results indicate that Existing plus Project traffic noise levels would range from approximately 48 dB CNEL at R9 to approximately 65 dB CNEL at R1. Future plus Project noise levels would range from approximately 52 dB CNEL at R11 to 67 dB CNEL at R1. Noise level increases as a result of the Land Exchange Alternative are also shown in Table 12.

The increase in noise levels as a result of the Land Exchange Alternative ranges from 0 to 4 dB; however, in one instance (M8/R14, a cluster of several rural residential properties located on the north side of Proctor Valley Road, north of the Land Exchange Alternative and west of Melody Road), the Existing plus Project scenario would be 15 dB higher than the existing scenario. The noise level at this location would increase from 39 dB CNEL in the existing condition to 54 dB CNEL in the Existing plus Project condition. The 15 dB increase in the Existing plus Project scenario versus the existing scenario is due to the fact that Proctor Valley Road currently carries very low traffic volumes. The baseline for a project is normally the condition that exists when the Notice of Preparation is published; therefore, the unimproved, low-traffic volume Proctor Valley Road is considered as the existing roadway condition in this analysis. It should be noted that in comparing the Future (Year 2030) traffic noise level at M8/R14 with the Future (Year 2030) plus Project traffic noise level, the incremental increase resulting from the Land Exchange Alternative at this location would be only 1 dB (Proctor Valley Road would be improved by 2030). In the context of community noise, 1 dB is not an audible change. Nonetheless, the Land Exchange Alternative would result in a 15 dB increase in the Existing plus Project Scenario, which is a **potentially significant impact** under the County's guidelines because the increase is greater than 10 dB.

Modeled receivers R1 through R13 are located in the City of Chula Vista, which has an exterior noise standard of 65 dB CNEL (City of Chula Vista 2005). The Land Exchange Alternative would not cause any of the modeled representative receivers in the City of Chula Vista to exceed the City of Chula Vista noise standard of 65 dB CNEL as a result of project-related traffic; thus, off-site noise impacts in the City of Chula Vista would be considered less than significant.

Receivers R14 through R18 are located in San Diego County, which has an exterior noise standard for single-family residences of 60 dB CNEL. As previously stated, one of the receivers (R8/M14, a cluster of several rural residential properties located on the north side of Proctor Valley Road, north of the Land Exchange Alternative and west of Melody Road) would cause one of the modeled representative receivers (M8/R14) to exceed the County's noise standard of 60 dB CNEL with implementation of the Land Exchange Alternative; however, the noise level increase due to the addition of Project traffic would be 1 dB and, therefore, the Project's impact would not be a "cumulatively considerable contribution."

Based upon the Guidelines for Determination of Significance in Section 5, Noise Sensitive Land Uses, the Land Exchange Alternative would result in a **potentially significant impact** in the form

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of a substantial noise increase at residential receiver M8/R14. Potential mitigation measures are discussed in Section 11.

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## 7 OPERATIONAL ACTIVITIES

Noise thresholds for operational activities are regulated through the County's Noise Ordinance, "Noise Abatement and Control" (County of San Diego 2011b). Section 36.404 includes sound level limits for non-construction related stationary noise sources (i.e., 1-hour average sound level limits) for the Land Exchange Alternative's operational related noise sources, such as mechanical equipment (e.g., pumps, rooftop equipment, condenser units, air-conditioning units, and pneumatic equipment), operation-related traffic (e.g., vehicle movement and engine noise), speakers, bells, chimes, and outdoor human activity in defined limited areas.

The allowable noise limits depend upon the zoning district and time of day. The 1-hour average sound level limits for residential zoned areas with a density of 11 or less dwelling units per acre is 50 dB from 7 a.m. to 10 p.m., and 45 dB from 10 p.m. to 7 a.m.<sup>3</sup> If the measured ambient noise level exceeds the applicable limit noted previously, the allowable 1-hour average noise levels shall be the ambient noise level.

Operational noise sources would include a potential elementary school, neighborhood parks and private recreational facilities, and operation of heating, ventilation, and air conditioning (HVAC) units at single-family homes and multifamily homes. Relative to the elementary school site, neighborhood parks and private recreational facilities, these uses would be subject to compliance with the County's Noise Ordinance. Therefore, through compliance with the County's Noise Ordinance, impacts are anticipated to be **less than significant**.

Relative to the air-conditioning units at each of the single-family and multifamily homes, the Land Exchange Alternative is still in its preliminary design stages, and the specific air-conditioning units and configurations are not yet known. Noise levels from HVAC equipment can vary substantially depending on unit efficiency, size, and location, but generally range from 50 to 65 dBA  $L_{eq}$  at a distance of 50 feet (City of Santa Ana 2010). Assuming a typical attenuation rate of 6 dB per doubling of distance for point-source type noise sources, noise levels attributed to unshielded HVAC mechanical systems could exceed the County daytime property line noise limit for residential land uses (50 dBA  $L_{eq}$ ) within 250 feet of the source. In addition, sources within 450 feet of an NSLU property line could exceed the County's nighttime noise limit (i.e., 45 dBA  $L_{eq}$ ) for stationary source noise. As a result, the impact of noise from HVAC equipment under the Land Exchange Alternative would be **potentially significant**. Potential mitigation measures are discussed in Section 11.

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<sup>3</sup> Based on Table 1, Site Utilization Plan – Land Use Summary, in this report, this is the appropriate standard.

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## 8 CONSTRUCTION ACTIVITIES

Noise thresholds for construction noise are regulated through the County's Noise Ordinance, Chapter 4, Noise Abatement and Control. Section 36.409 in this ordinance sets limits on the time of day and days of the week that construction can occur as well as setting noise limits for construction activities. In summary, the ordinance prohibits operating construction equipment on:

- Mondays through Saturdays except between the hours of 7 a.m. and 7 p.m., and
- Sundays, and days appointed by the President, Governor, or Board of Supervisors for a public fast, Thanksgiving, or other holiday.

In addition, the Noise Ordinance requires that no equipment shall be operated so as to cause an 8-hour average construction noise level in excess of 75 dB between 7 a.m. and 7 p.m. when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is being received.

### 8.1 Construction Noise

Construction noise and vibration are temporary phenomena. Construction noise and vibration levels would vary from hour to hour and day to day, depending on the equipment in use, the operations being performed, and the distance between the source and receptor.

The Land Exchange Alternative's construction activities would consist of the following:

- **Ground clearing and mass grading.** Noise sources could include scrapers, excavators, bulldozers, heavy trucks.
- **Final grading.** Noise sources could include such equipment as loaders and backhoes.
- **Construction of foundations.** Noise sources could include backhoes, heavy concrete trucks, and mixers.
- **Facade and interior construction.** Noise sources could include hammering, drilling, generators, compressors, and light truck traffic.
- **Mechanical equipment/pump systems installation.** Noise sources could include hammering, drilling, generators, compressors, and light truck traffic.
- **Site cleanup.** Noise sources could include trucks, landscape rollers, and compactors.

To assess the potential noise effects of construction activities, this noise analysis used data from an extensive field study of various types of industrial and commercial construction projects (EPA 1971). Noise levels associated with various construction phases, assuming all pertinent equipment is

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present and operating at a reference distance of 50 feet are shown in Table 13. Because of vehicle technology improvements and stricter noise regulations since the field study was published in 1971, these levels likely are overstated. Nonetheless, this analysis conservatively uses the average noise levels shown in Table 13 for the loudest construction phase. This information indicates that the overall (hourly) average noise level generated on a construction site could be 89 dBA at a distance of 50 feet during excavation and finishing phases. The noise levels presented are value ranges; the magnitude of construction noise emission typically varies over time because construction activity is intermittent and the power demands on construction equipment (and the resulting noise output) are cyclical. Typically, a 12-hour  $L_{eq}$  would be lower than an hourly  $L_{eq}$ .

Construction may also involve blasting to break up bedrock close to the ground surface. Typically, most of the noise generated by blasting is very low in frequency—below the frequency range audible to humans. The use of impulsive noise equipment and construction activities that would result in impulse noise (e.g., pile driving or explosives blasting) is discussed in Section 9, Potential Impulsive Noise Impacts.

Noise levels generated by construction equipment (or by any point source) decrease at a rate of approximately 6 dBA per doubling of distance from the source (Harris 1979). Since the loudest construction activities associated with on-site construction of the Land Exchange Alternative would be during excavation and grading, as well as finishing (approximately 89 dBA at 50 feet), the on-site construction noise would be approximately 83 dBA at 100 feet, 77 dBA at 200 feet, 71 dBA at 400 feet, and so on. Intervening structures that block the line of sight, such as buildings, would further decrease the resultant noise level by a minimum of 5 dBA. The effects of molecular air absorption and anomalous excess attenuation would further reduce the noise level from construction activities at more distant locations at the rates of 0.7 dBA and 1 dBA per 1,000 feet, respectively.

**Table 13**  
**Typical Noise Levels from Construction Activities for Large Construction Projects**

Construction Activity	Average Sound Level at 50 feet (dBA $L_{eq}$ ) <sup>a</sup>	Standard Deviation (dB)
Ground clearing	84	7
Excavation/grading	89	6
Foundations	78	3
Erection	87	6
Finishing	89	7

Source: EPA 1971.

dB = decibels; dBA = A-weighted decibels;  $L_{eq}$  = equivalent continuous sound level

<sup>a</sup> Sound level with all pertinent equipment operating.

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## 8.2 Construction Noise Impact to Off-Site Residences

The Land Exchange Alternative has the potential to result in short-term noise impacts at off-site residential NSLUs as a result of the construction of off-site improvements to Proctor Valley Road, as well as development of Otay Ranch Village 14.

### 8.2.1 Proctor Valley Road Improvements

As part of the Land Exchange Alternative, the currently unimproved Proctor Valley Road would be improved approximately from east of Northwoods Drive/Agua Vista Drive in Chula Vista to Echo Valley Road in Jamul. Additional infrastructure would be included within the Proctor Valley Road easement, including a sewer, water and dry utility extension, a sewer pump station, and the Proctor Valley Regional Pathway.

The nearest existing NSLUs with respect to the Proctor Valley Road improvements are several single-family residences located along Proctor Valley Road near Echo Valley Road in Jamul, approximately 200 feet away from the northern extent of roadway improvements. Additionally, existing single-family residences are located approximately 220 feet away from the westerly extent of proposed off-site Proctor Valley Road improvements, adjacent to Proctor Valley Road at Northwoods Drive/Agua Vista Drive in the City of Chula Vista. The nearest existing off-site NSLUs are shown in Figure 8.

Construction of the Proctor Valley Road improvements would result in noise levels as high as 77 dBA  $L_{eq}$  at the nearest existing residences 200 feet away, and as high as 76 dBA  $L_{eq}$  at the next-nearest existing residences 220 feet away. Because construction work is cyclical in nature, the 8-hour average noise levels would be lower. Nonetheless, construction associated with the Land Exchange Alternative could result in exceedances of the County's 75 dBA  $L_{eq(8-hr)}$  noise standard at the nearest existing NSLUs in Jamul (unincorporated San Diego County). This is therefore considered to be a **potentially significant impact**. Potential mitigation measures are discussed in Section 11.

While the City does not have a construction noise level threshold, noise from construction operations at the nearest existing residence in Chula Vista would exceed existing ambient noise levels and, potentially, constitute a temporary substantial noise increase. Therefore, this is considered to be a **potentially significant impact**. Potential mitigation measures are discussed in Section 11.

### 8.2.2 Otay Ranch Village 14

The nearest existing NSLUs to the Land Exchange Area are single-family residences located approximately 3,100 feet to the west of the Land Exchange Area (in the Bella Lago community of Chula Vista) and approximately 3,700 to the north of the Land Exchange Area (in the southwestern

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portion of Jamul), as shown in Figure 8. Land Exchange Alternative construction would result in noise levels as high as 48 dBA  $L_{eq}$  at the nearest existing residences 3,100 feet away, and as high as 45 dBA  $L_{eq}$  at the next-nearest existing residences 3,700 feet away. This assumes a direct line of sight from the receiver to the construction area; in the case of the Land Exchange Alternative, intervening terrain or structures could further reduce the noise level a minimum of 5 dB further. Therefore, construction activities associated with Otay Ranch Village 14 would result in a **less than significant impact** at existing NSLUs.

### 8.3 Construction Noise Impact to Adjacent On-Site Residences

Because the development of the Land Exchange Alternative would be a multiyear endeavor, portions of the development would be completed and occupied during the construction of subsequent portions (phases). Therefore, the occupied Land Exchange Alternative phases have the potential to be impacted by noise from ongoing construction activities. Location-specific phasing schedules are not available at this time; it is therefore possible that construction of a new phase of the Land Exchange Alternative could take place within as near as 50 feet of an occupied phase. In such an instance, short-term noise levels as high as 89 dBA  $L_{eq}$  could result. Because construction work is cyclical in nature, the 8-hour average noise levels would be lower. Nonetheless, construction associated with the Land Exchange Alternative could result in exceedances of the County's 75 dBA  $L_{eq(8-hr)}$  noise standard and is therefore considered to be a **potentially significant impact**. Potential mitigation measures are discussed in Section 11.



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### 9 POTENTIAL IMPULSIVE NOISE IMPACTS

Impulsive noise sources associated with construction activities could include rock drilling and blasting. Pile driving is not anticipated to be necessary as part of this Land Exchange Alternative.

It is preliminarily estimated that approximately 1,803,962 cubic yards of rock would be blasted during the early stages of excavation and mass grading for the Land Exchange Alternative (Hunsaker & Associates 2015b). Blasting (and the associated drilling that precedes blasting) would be limited to the hours between 7 a.m. and 7 p.m. Construction blasting generates a maximum noise level of approximately 94 dB at a distance of 50 feet (FHWA 2006). This source noise level is used in this analysis because it provides a reasonable estimate of the construction blasting noise level. However, the noise level would vary depending on various factors, as more fully described in the following text. The blast is generally perceived as a dull thud rather than as a loud explosion.

**U.S. Bureau of Mines:** The U.S. Bureau of Mines has provided an impact guide in the area of structural and human response to vibration (USBM 1980). The criteria are well accepted for all types of ground vibration and are based on the PPV of the receiving structure. The potential for damage to residential structures is greater with low-frequency blast vibration (below 40 Hz) than with high-frequency blast vibration (40 Hz and above). For low-frequency blast vibration (below 40 Hz), a vibration limit of 0.75 inches per second for modern drywall construction and 0.50 inches per second for older plaster-on-lath construction is proposed. For high frequencies (above 40 Hz), a limit of 2 inches per second for all types of construction is proposed.

The U.S. Bureau of Mines also published a document regarding recommendations for maximum safe air overpressure levels for blasting (USBM 1980). This document, titled “Structure Response and Damage Produced by Airblast from Surface Mining,” recommends a maximum safe air overpressure of 134 dB (linear) for residential structures. The first occurrence of airblast damage is usually the breakage of poorly mounted windows at approximately 152 dB (linear) (Caltrans 2013b). The response and annoyance problem from airblast is probably primarily caused by wall and window rattling and the resulting secondary noises. Although these effects would not entirely be precluded by the recommended levels, the recommended levels are considered low enough to preclude damage to residential structures, but they may not address the annoyance of individuals.

**County of San Diego Blasting Permit:** To conduct blasting, a blasting permit must be obtained from the County prior to blasting (County of San Diego 2011b). The permit is issued in accordance with the California Health and Safety Code requirements. The permit ensures that blasting is conducted in a safe manner. As part of the permit conditions, pre-blast notifications, pre-blast structure survey inspections for structures within 300 feet of the blast site, monitoring, and post-blast inspections are required.

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Blasting involves drilling a series of bore holes and placing explosives in each hole. By limiting the amount of explosives in each hole, the blasting contractor can limit the fraction of the total energy released at any single time, which in turn can reduce noise and vibration levels. Rock drilling generates impulsive noise from the striking of the hammer with the anvil within the drill body, which drives the drill bit into the rock. Rock drilling generates noise levels of approximately 80 to 98 dB  $L_{\max}$  at a distance of 50 feet. Given a typical work cycle, this would equate to 78 dBA  $L_{\text{eq}}$  at 50 feet. Assuming a noise level of 98 dBA  $L_{\max}$  at 50 feet, the noise level from rock drilling would be less than the County's noise standard for impulsive noise at a distance of approximately 350 feet.

When explosive charges detonate in rock, almost all of the available energy from the explosion is used in breaking and displacing the rock mass. However, some blast energy escapes into the atmosphere as a sequence of airborne sound waves, a phenomenon known as “air-blast overpressure.” These sound waves are very low frequency, below the audible range. Very high air-blast overpressure levels can rattle or in some cases break windows. However, air-blast overpressure rarely reaches levels that could cause building damage with modern blasting practices. Based upon preliminary design information (Hunsaker & Associates 2015a), the nearest blasting would take place approximately 4,650 feet away from the nearest residences (located in Jamul, to the north of the Land Exchange Area). However, because the development of the Land Exchange Alternative would be a multiyear endeavor, there is the potential that portions of the development would be completed and occupied when blasting activities are underway within subsequent portions (phases). Therefore, the occupied Land Exchange Alternative phases have the potential to be impacted by noise from on-going blasting activities. Other details such as blast-charge weights are not known at this time; thus, air-blast overpressures cannot be predicted. Therefore, impacts associated with blasting are **potentially significant**. Mitigation measures are discussed in Section 11.

### Portable Rock-Crushing/Processing Facility

A portable rock-crushing/processing facility would be used on site during construction activities. Typically, rock-crushing operation would begin with a front-end loader picking up material and dumping the material into a primary crusher. The material would then be crushed, screened, and stacked in product piles. The material would be stockpiled adjacent to the rock-crushing equipment. All material would be used on site. Electric power would most likely be provided by a diesel engine generator. Based on noise measurements that have been conducted for portable rock crushing operations, the rock crushing activity would generate a 1-hour average noise level of approximately 80 dBA at a distance of 100 feet from the primary crusher. The primary crusher would also generate impulsive noise events. Maximum noise levels associated with the primary crusher could reach approximately 88 dBA at 100 feet.

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The closest existing off-site residence property line or NSLU could be located within approximately 4,650 feet of the proposed rock crushing. At this distance, the noise level (both 8-hour average and impulsive noise) associated with the rock-crushing activities would be approximately 39 dBA  $L_{eq}$  and approximately 47 dBA  $L_{max}$ . However, because the development of the Land Exchange Alternative would be a multiyear endeavor, there is the potential that portions of the development would be completed and occupied when rock-crushing activities are underway within subsequent portions (phases). Therefore, the occupied Land Exchange Alternative phases have the potential to be impacted by noise from ongoing rock-crushing activities. Therefore, impacts associated with rock-crushing are **potentially significant**. At a distance of 250 feet, the average noise level from a typical rock-crushing operation would be reduced to below the County's 8-hour construction noise and impulsive noise thresholds. Where possible, rock-crushing equipment should be located further than 250 feet to minimize annoyance to nearby NSLU. Mitigation measures are discussed in Section 11.

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## 10 GROUNDBORNE VIBRATION AND NOISE IMPACTS

### 10.1 Guidelines for the Determination of Significance

Based upon the County's *Guidelines for Determining Significance: Noise* (County of San Diego 2009a), the Land Exchange Alternative would result in a significant impact related to groundborne noise and vibration if Project implementation would expose the Land Exchange Alternative's land use types to vibration and noise levels equal to or exceeding designated levels. The identified land use types and corresponding vibration and noise levels are listed in Tables 14 and 15.

**Table 14**  
**Guidelines for Determining the Significance of Groundborne Vibration and Noise Impacts**

Land Use Category	Groundborne Vibration Impact Levels (inches/second RMS)		Groundborne Noise Impact Levels (dB re 20 micropascals)	
	Frequent Events <sup>a</sup>	Occasional or Infrequent Events <sup>b</sup>	Frequent Events <sup>a</sup>	Occasional or Infrequent Events <sup>b</sup>
Category 1: Buildings where low ambient vibration is essential for interior operations (research and manufacturing facilities with special vibration constraints) <sup>f</sup>	0.0018 <sup>c</sup>	0.0018 <sup>c</sup>	Not applicable <sup>d,e</sup>	Not applicable <sup>d,e</sup>
Category 2: Residences and buildings where people normally sleep (hotels, hospitals, residences, and other sleeping facilities) <sup>f</sup>	0.0040	0.010	35 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use (schools, churches, libraries, other institutions, and quiet offices) <sup>f</sup>	0.0056	0.014	40 dBA	48 dBA

**Source:** DOT 2006.

RMS = root mean square; dB = decibel; re = relative; dBA = A-weighted decibel

<sup>a</sup> "Frequent events" is defined as more than 70 vibration events per day. Most rapid transit projects fall into this category.

<sup>b</sup> "Infrequent events" is defined as fewer than 70 vibration events per day. This category includes most commuter rail systems.

<sup>c</sup> This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research would require detailed evaluation to define acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the heating, ventilation, and air conditioning (HVAC) systems and stiffened floors.

<sup>d</sup> Vibration-sensitive equipment is not sensitive to groundborne noise.

<sup>e</sup> There are some buildings, such as concert halls, TV and recording studios, and theaters that can be very sensitive to vibration and noise but do not fit into any of the three categories. Table 24 gives criteria for acceptable levels of groundborne vibration and noise for these various types of special uses.

<sup>f</sup> For Categories 2 and 3 with occupied facilities, isolated events such as blasting are significant when the PPV exceeds 1 inch per second. Nontransportation vibration sources such as impact pile drivers or hydraulic breakers are significant when their PPV exceeds 0.1 inches per second. More specific criteria for structures and potential annoyance were developed by Caltrans (2013b) and would be used to evaluate these continuous or transient sources in San Diego County.

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**Table 15**  
**Guidelines for Determining the Significance of Groundborne Vibration and Noise Impacts for Special Buildings**

Type of Building or Room	Groundborne Vibration Impact Levels (inches/second RMS)		Groundborne Noise Impact Levels (dB re 20 micropascals)	
	<i>Frequent Events<sup>a</sup></i>	<i>Occasional or Infrequent Event<sup>b</sup></i>	<i>Frequent Events<sup>a</sup></i>	<i>Occasional or Infrequent Events<sup>b</sup></i>
Concert halls, TV studios, and recording studios	0.0018	0.0018	25 dBA	25 dBA
Auditoriums	0.0040	0.010	30 dBA	38 dBA
Theaters	0.0040	0.010	35 dBA	43 dBA

**Source:** DOT 2006.

RMS = root mean square; dB = decibel; re = relative; dBA = A-weighted decibel

<sup>a</sup> "Frequent Events" is defined as more than 70 vibration events per day. Most rapid transit projects fall into this category.

<sup>b</sup> "Infrequent Events" is defined as fewer than 70 vibration events per day. This category includes most commuter rail systems.

As stated in note f of Table 14, California Department of Transportation (Caltrans) criteria shall be used for pile drivers and transient sources such as those associated with Land Exchange Alternative construction. As previously noted, pile driving is not anticipated for this Land Exchange Alternative. For the purposes of this vibration analysis, impacts from general construction would occur if vibration levels exceed 0.0040 inches per second root mean square (RMS) (County of San Diego 2009a).

## 10.2 Potential Groundborne Vibration and Noise Impacts

### 10.2.1 Operations

No operational components of the Land Exchange Alternative include significant groundborne noise or vibration sources, and no significant vibrations sources currently exist, or are planned, in the Land Exchange Area. Thus, no significant groundborne noise or vibration impacts would occur with the operation of the Land Exchange Alternative.

### 10.2.2 Construction

In general, on-site construction equipment that would cause the most groundborne vibration and noise would be associated with site grading and pile driving for foundations. For this project, no pile driving is anticipated. Groundborne vibration associated with blasting is anticipated and is addressed separately below.

During grading, the largest groundborne vibration levels are anticipated to be generated by large bulldozers and loaded trucks used for earthmoving. According to the Federal Transit Administration, vibration levels associated with the use of bulldozers range from approximately

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0.003 to 0.089 inches per second PPV and 58 to 87 VdB at 25 feet, as shown in Table 16. Additionally, loaded trucks used for soil hauling during grading could generate vibration levels of approximately 0.076 inches per second PPV and noise levels of 86 VdB at 25 feet. According to the Federal Transit Administration's methodology for determining vibration propagation, vibration levels would exceed County-recommended Caltrans thresholds for residences of 0.004 PPV inches per second RMS within 190 feet of large bulldozers and 170 feet of loaded trucks.

**Table 16**  
**Typical Construction Equipment Vibration Levels**

Equipment	PPV at 25 feet (inches per second)	Approximate Noise Level at 25 Feet*
Pile drive (impact) – typical	0.644	104
Pile drive (sonic) – typical	0.170	93
Vibratory roller	0.210	94
Jackhammer	0.035	79
Large bulldozer	0.089	87
Loaded trucks	0.076	86
Small bulldozer	0.003	58

**Sources:** DOT 2006; Caltrans 2013b.

PPV = peak particle velocity

\*Where noise level is the velocity level in decibels (VdB) referenced to 1 microinches/second and based on the RMS velocity amplitude.

The nearest sensitive receptors to Land Exchange Area's construction activities that could produce high vibration levels would be at the same residences to the north and west of off-site Proctor Valley Road improvements in Jamul and Chula Vista, identified as part of the construction noise impact assessment (see Section 8.2.1), located approximately 200 feet and 220 feet away, respectively. Therefore, at a distance of 200 feet and greater, vibration levels from grading activities are not anticipated to exceed 0.004 inches per second RMS or 0.1 inches per second PPV at the nearest off-site residences. This impact would be **less than significant**.

Because the development of the Land Exchange Alternative would be a multiyear endeavor, portions of the development would be completed and occupied during the construction of subsequent portions (phases). Therefore, the occupied Land Exchange Alternative phases have the potential to be impacted by vibration from on-going construction activities. Location-specific phasing schedules are not available at this time; it is therefore possible that construction of a new phase of the Land Exchange Alternative could take place as near as 50 feet of an occupied phase. In such an instance, short-term vibration levels as high as 0.03 inches per second RMS could result. Therefore, vibration levels may exceed 0.004 inches per second RMS from grading activities on and off site at the nearest on-site residence. This impact would be **potentially significant**. Mitigation measures are discussed in Section 11.

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### Blasting

Due to the geologic character of the Land Exchange Area, blasting and/or on-site rock breaking is anticipated during site preparation activities for the Land Exchange Alternative. Thus, construction-related blasting activities may result in significant groundborne vibrations or groundborne noise impacts. At the current stage of the project design, a blasting study has not been completed, and no specific blasting timelines or blast numbers are available. However, it is anticipated (based upon prior projects) that blasting is expected to occur at 2- to 3-day intervals with no more than one blast per day. Preliminary blasting location identification indicates that blasting could take place within approximately 4,650 feet of existing residences (Hunsaker & Associates 2015a).

As discussed in Section 9, Potential Impulsive Noise Impacts, when explosive charges detonate in rock, almost all of the available energy from the explosion is used in breaking and displacing the rock mass. However, a small portion of the energy is released in the form of vibration waves that radiate away from the charge location. The strength, or amplitude, of the waves reduces as the distance from the charge increases. The rate of amplitude decay depends on local geological conditions but can be estimated with a reasonable degree of consistency, which allows regulatory agencies to control blasting operations by means of relationships between distance and explosive quantity.

The explosive charges used in mining and mass grading are typically wholly contained in the ground. However, because the exact blasting locations, necessary geotechnical data or blasting and materials handling plans are not known at this time, it is not possible to conduct a groundborne vibration analysis assessing the proposed blasting and materials handling associated with the Land Exchange Alternative. Therefore, for purposes of this analysis, impacts are considered **potentially significant**. Mitigation measures are discussed in Section 11.



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## 11 PROJECT DESIGN FEATURES AND MITIGATION MEASURES

### 11.1 Project Design Features

No project design features are incorporated into the Land Exchange Alternative.

### 11.2 Mitigation Measures

The following mitigation measures are required to address the identified potentially significant noise impacts.

Due to the conflicts with the proposed land uses and predicted future vehicular noise levels from Proctor Valley Road, the following mitigation measures would be required to reduce potential traffic noise impacts to a **less than significant** level, and ensure the Otay Ranch Village 14 and Planning Area 16/19 Land Exchange Alternative (Land Exchange Alternative) complies with the County of San Diego's (County's) noise standards:

**M-N-1** The single-family residential lots shown in Figure 7 with rear- or side-yard exposures adjacent to Proctor Valley Road shall include minimum 6-foot-high solid noise barriers along the exposure. The noise barriers may be constructed as a wall, berm, or a combination of both. The materials used in the construction of the barrier are required to have a minimum surface density of 4 pounds per square foot. They may consist of masonry material, 0.625-inch-thick Plexiglas, 0.25-inch-thick plate glass, or a combination of these materials. The barriers must be designed so there are no openings or cracks.

#### Interior Locations

**M-N-2** Prior to issuance of building permits for all proposed residential units (and after preparation of detailed building plans) directly adjacent to Proctor Valley Road, as shown in Figure 7, the building permit applicant shall demonstrate that interior noise levels due to exterior noise sources will not exceed the applicable County of San Diego noise ordinance standard for the subject land use. In addition to the installation of sound walls that will be constructed under M-N-1, it is anticipated that compliance would be achieved by structure setbacks, acoustically rated windows and doors, or air conditioning or equivalent forced air circulation to allow occupancy with closed windows, which, for most construction, would provide sufficient exterior-to-interior noise reduction. An acoustical study shall be prepared to demonstrate and verify that interior noise levels will be below 45 Community Noise Equivalent Level (CNEL) within all habitable residential rooms.

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**Implementation:** Land Exchange Alternative applicant(s) and primary contractor(s) of all Land Exchange Alternative phases for the residential units directly adjacent to Proctor Valley Road.

**Timing:** A Noise Restriction Easement will be dedicated to the Final Map to include the following requirement: Prior to issuance of building permits for development of on-site residential units directly adjacent to Proctor Valley Road, after detailed building plans are available and model numbers/types have been sited on a precise grading plan.

**Enforcement:** County of San Diego

### Off-Site Noise Impacts

As previously discussed, in comparing Existing and Existing plus Project noise levels, the Land Exchange Alternative would result in a substantial increase in noise levels (from 39 dBA CNEL in the Existing scenario to 54 dBA CNEL in the Existing plus Project scenario) at existing off-site residences located adjacent to Proctor Valley Road north of the Land Exchange Alternative and west of Melody Road. Although the resulting noise level would be an acceptable 54 dBA CNEL, the increase would exceed 10 dBA, thereby resulting in a significant impact. The affected roadway segment and adjacent residences are shown in Figure 9, Off-Site Noise Impacts – M8/R14.

Several methods are available to reduce traffic noise, such as noise barriers, road surface improvements, regulatory measures (such as lower speed limits), and traffic calming devices (such as speed bumps). However, none of these measures are considered feasible.

For example, constructing noise barriers (e.g., sound walls) on private property at M8/R14 and surrounding residences would require permission of the property owner and raise potential liability and maintenance concerns. Additionally, to be most effective noise barriers would need to be continuous; however, due to the need for driveways and other access points, the continuity of the barrier and its effectiveness would be limited.

Measures such as reduced speed limits or traffic calming devices would require legal or government enforcement and may have undesirable or unacceptable impacts in other areas, such as speed bumps lengthening emergency response calls.

For these reasons, mitigation of off-site impacts from noise level increases along Proctor Valley Road north of the Land Exchange Alternative and west of Melody Road is considered infeasible and the impact, therefore, a **significant and unavoidable direct impact** of the Land Exchange Alternative. It is important to note, however, that identification of the significant impact is based on

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the Existing plus Project scenario and the increase in noise levels over existing levels (see Table 12.) However, the resulting noise level under this scenario would be 54 CNEL, which is within the County's compatibility criteria.

### On-Site Stationary Source Noise Impacts

**M-N-3** Prior to the issuance of any building permit for stationary noise-generating equipment such as heating, ventilation, and air conditioning (HVAC) systems, the Land Exchange Alternative applicant, or its designee, shall prepare an acoustical study(s) of the proposed stationary noise sources associated with the HVAC systems, for submittal to the County of San Diego (County) for review and approval. The acoustical study shall identify all noise-generating equipment and predict noise levels from all identified equipment at the applicable property lines. Where predicted noise levels would exceed those levels established by the County's Noise Ordinance, Section 36.404, the acoustical study shall identify mitigation measures shown to effectively reduce noise levels (e.g., enclosures, barriers, site orientation) to be implemented, as necessary, to comply with the County's Noise Ordinance, Section 36.404. Such mitigation measures shall be implemented by the applicant, or its designee, prior to issuance of any building permit.

**Implementation:** Land Exchange Alternative applicant(s) and primary contractor(s) of all Land Exchange Alternative phases.

**Timing:** Prior to issuance of building permits.

**Enforcement:** County of San Diego

### Construction Noise Impacts

Construction activities have the potential to generate short-term noise levels greater than 75 dBA equivalent sound level ( $L_{eq(8-hr)}$ ) at existing NSLUs near off-site Proctor Valley Road improvements (see Section 8.2.2) and at future on-site receivers adjacent to subsequent construction. The following mitigation measures will be implemented and will be included as notes to the grading plan.

**M-N-4** The Land Exchange Alternative applicant, or its designee, shall take those steps necessary to ensure that all construction equipment shall be properly maintained and equipped with noise-reduction intake, exhaust mufflers, and engine shrouds, in accordance with manufacturers' recommendations. Equipment engine shrouds shall be closed during equipment operation.

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- M-N-5** The Land Exchange Alternative applicant, or its designee, shall take those steps necessary to ensure that whenever feasible, electrical power shall be used to run air compressors and similar power tools.
- M-N-6** The Land Exchange Alternative applicant, or its designee, shall take those steps necessary to ensure that all equipment staging areas shall be located as far as feasible from occupied residences or schools.
- M-N-7** The Land Exchange Alternative applicant, or its designee, shall take those steps necessary to ensure that all construction activity, on and off the Land Exchange Area, noise attenuation techniques shall be employed, as needed, to ensure that noise levels remain below 75 dBA  $L_{eq}$  at existing noise-sensitive land uses. Such techniques shall include, but are not limited to, the use of sound blankets on noise-generating equipment and the construction of temporary sound barriers adjacent to construction sites between affected uses to achieve noise levels below 75 dBA  $L_{eq}$ .

**Implementation:** Land Exchange Alternative applicant(s) and primary contractor(s) of all Land Exchange Alternative phases involving construction.

**Timing:** Prior to and during Project-related construction.

**Enforcement:** County of San Diego

### Impulsive Noise Impacts (Blasting and Rock Crushing)

- M-N-8** Prior to approval of the grading permit issued for any portion of the Land Exchange Area, the Land Exchange Alternative applicant or the designated contractor shall prepare a blast drilling and monitoring plan with an estimate of noise and vibration levels of each blast at noise-sensitive land uses within 1,000 feet of each blast. Where potential exceedance of either the County of San Diego (County) or City of Chula Vista's Noise Ordinance is identified, the blast drilling and monitoring plan shall identify mitigation measures shown to effectively reduce noise and vibration levels (e.g., altering orientation of blast progression, increased delay between charge detonations, and presplitting) to be implemented to comply with the noise level limits of the County's Noise Ordinance, Sections 36.409 and 36.410, the Chula Vista Noise Ordinance, Chapter 19.68 (whichever is applicable), as well as the vibration-level limits of 1 inch per second peak particle velocity (PPV). Such measures shall be implemented by the Land Exchange Alternative applicant, or its designee, prior to the issuance of the grading permit.

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Additionally, all Land Exchange Alternative phases involving blasting shall conform to the following requirements:

- All blasting shall be performed by a blast contractor and blasting personnel licensed to operate in the County.
- Each blast shall be monitored and recorded with an air-blast overpressure monitor and groundborne vibration accelerometer that is located outside the closest residence to the blast and is approved by the County Blasting shall not exceed 0.1 inches per second PPV at the nearest occupied residence, in accordance with County's Noise Guidelines, Section 4.3.

**Implementation:** Land Exchange Alternative applicant(s) and primary contractor(s) of all Project phases involving blasting.

**Timing:** Prior to and during Land Exchange Alternative-related blasting activities.

**Enforcement:** County

**M-N-9** Prior to approval of the grading permit for any portion of the Land Exchange Alternative, the Land Exchange Alternative applicant, or its designee, shall take those steps necessary to ensure that on-site rock crusher facilities are located a minimum of 250 feet from the property line of occupied residences or other noise-sensitive uses.

**Implementation:** Applicant(s), or its designee, and primary contractor(s) of all Land Exchange Alternative phases involving rock crushing.

**Timing:** Prior to and during Land Exchange Alternative-related rock crushing activities.

**Enforcement:** County of San Diego

### On-Site Vibration Impacts

**M-N-10** Prior to beginning construction of any project component within 300 feet of an existing or future occupied residence, the Land Exchange Alternative applicant, or its designee, shall require preparation of a vibration monitoring plan for submittal to the County of San Diego (County) noise control officer for review and approval. At a minimum, the vibration monitoring plan shall require data be sent to the County noise control officer or designee on a weekly basis or more frequently as determined by the noise control officer. The data shall include vibration level measurements taken during the previous work period. In the event that the County noise control

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officer determines there is reasonable probability that future measured vibration levels would exceed allowable limits, the County noise control officer or designee shall take the steps necessary to ensure that future vibration levels do not exceed such limits, including suspending further construction activities that would result in excessive vibration levels until either alternative equipment or alternative construction procedures can be used that generate vibration levels that do not exceed 0.004 inches per second RMS or 0.1 inches per second peak particle velocity (PPV) at the nearest residential structure. Construction activities not associated with vibration generation could continue.

The vibration monitoring plan shall be prepared and administered by a County-approved noise consultant. In addition to the data described previously, the vibration monitoring plan shall also include the location of vibration monitors, the vibration instrumentation used, a data acquisition and retention plan, and exceedance notification and reporting procedures. A description of these plan components is provided in the following text.

**Location of Vibration Monitors:** The vibration monitoring plan shall include a scaled plan indicating monitoring locations, including the location of measurements to be taken at construction site boundaries and at nearby residential properties.

**Vibration Instrumentation:** Vibration monitors shall be capable of measuring maximum unweighted RMS and PPV levels triaxially (in three directions) over a frequency range of 1 to 100 Hertz (Hz). The vibration monitor shall be set to automatically record daily events during working hours and to record peak triaxial PPV values in 5-minute interval histogram plots. The method of coupling the geophones to the ground shall be described and included in the report. The vibration monitors shall be calibrated within 1 year prior to the measurement, and a certified laboratory conformance report shall be included in the report.

**Data Acquisition:** The information to be provided in the data reports shall include, at a minimum, daily histogram plots of PPV versus time of day for three triaxial directions, and maximum peak vector sum PPV and maximum frequency for each direction. The reports shall also identify the construction equipment operation during the monitoring period and their locations and distances to all vibration measurement locations.

**Exceedance Notification and Reporting Procedures:** The vibration monitoring plan shall include a description of the notification of exceedance and reporting procedures, and the follow-up procedures taken to reduce vibration levels to below the allowable limits.

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**Implementation:** Applicant(s), or its designee, and primary contractor(s) of all project phases involving the use of heavy construction equipment within 300 feet of existing or future occupied residence.

**Timing:** Prior to and during construction activities.

**Enforcement:** County of San Diego

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### 12 SUMMARY OF PROJECT IMPACTS, MITIGATION, AND CONCLUSION

#### Vehicle Noise Impacts

Existing and future Proctor Valley Road vehicle noise levels at all identified outdoor living areas of the Land Exchange Alternative residential units would comply with the County's 60 CNEL exterior noise criterion, provided that the Land Exchange Alternative Mitigation Measure M-N-1 (construction of 6-foot-high, solid walls at single-family residential units adjacent to Proctor Valley Road (see Figure 7 for locations) is implemented. Thus, vehicle noise impacts to on-site residences would be **less than significant**.

The noise levels at the second-floor level of proposed residences directly adjacent to Proctor Valley Road could potentially exceed 60 dB CNEL. Thus, without mitigation, the interior noise levels could exceed the County's 45 dB CNEL interior noise criterion. Prior to issuance of building permits, an interior noise study would be required for the residences directly adjacent to Proctor Valley Road to ensure that the interior CNEL would not exceed 45 dB (mitigation measure M-N-2). The residences would most likely require air-conditioning and/or mechanical ventilation systems to meet the County's interior noise standard. Sound-rated windows may also be required. Thus, impacts would be considered **less than significant with mitigation incorporated**.

Land Exchange Alternative-related traffic noise impacts at existing off-site NSLU would be less than significant, with the exception of one location. At residences located along Proctor Valley Road north of the Land Exchange Alternative and west of Melody Road, a significant increase in traffic noise along this roadway segment would occur compared to existing traffic noise levels, because Proctor Valley Road currently experiences very low traffic volumes. Because there is no feasible mitigation for this exceedance, this impact is considered **significant and unavoidable**.

#### On-Site Operational Noise

Noise from on-site operational activities is considered potentially significant impacts. Mitigation measures to reduce potential impacts to a level below significance are provided.

The Land Exchange Alternative's operational noise sources would include air-conditioning units at each of the single-family and multifamily homes. Noise from HVAC equipment at the Land Exchange Alternative is considered a potentially significant impact. Mitigation measure M-N-3 is provided to reduce potential impacts to **less than significant**.

No operational components of the Land Exchange Alternative include significant groundborne noise or vibration sources, and no significant vibrations sources currently exist, or are planned, in the

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Land Exchange Area. Thus, no significant groundborne noise or vibration impacts would occur with the operation of the Land Exchange Alternative.

### Construction Noise and Vibration Impact

Construction noise associated with improvements of Proctor Valley Road, as well as on-site construction noise at adjacent, occupied residences are considered potentially significant impacts. Mitigation measures M-N-4 through M-N-7 are provided to reduce potential impacts to **less than significant**.

Noise from blasting activities associated with the excavation and mass-grading phase of the Land Exchange Alternative is considered potentially significant, and mitigation measure M-N-8 is provided to reduce potential impacts to **less than significant**.

Based on the anticipated construction equipment and distance from the equipment to the proposed homes, construction activities would result in vibration anticipated to be below the level of human perception at existing off-site noise/vibration sensitive land uses. Thus, construction vibration would not disturb the off-site residences and the potential vibration impacts to these residential structures are **less than significant**.

Because the development of the Land Exchange Alternative would be a multiyear endeavor, portions of the Land Exchange Alternative would be completed and occupied during the construction of subsequent portions (phases). Vibration from construction activities, if they occur within 200 feet of on-site residences, has the potential to result in vibration levels exceeding County standards. This is considered potentially significant, and mitigation measure M-N-9 is provided to reduce potential impacts to **less than significant**.

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### 13 CERTIFICATION

This report has been prepared by Mike Greene, who is on the County-approved Acoustical Consultant list.

  
Mike Greene, INCE Bd. Cert. Acoustician

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